

**FINAL  
SITE INVESTIGATION  
NAVAL WEAPONS INDUSTRIAL  
RESERVE PLANT  
CALVERTON, NEW YORK  
NORTHERN AND CHESAPEAKE DIVISIONS  
VOLUME I**

**PREPARED BY**

**HALLIBURTON NUS  
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PITTSBURGH, PENNSYLVANIA**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY  
(CLEAN) PROGRAM**

**CONTRACT NUMBER N62472-90-D-1298  
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**APRIL 1992**



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**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY  
(CLEAN)**

**FINAL**

**SITE INVESTIGATION REPORT**

**VOLUME 1**

**NAVAL WEAPONS INDUSTRIAL RESERVE PLANT**

**CALVERTON, NEW YORK**

**NORTHERN AND CHESAPEAKE DIVISIONS**

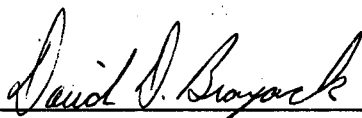
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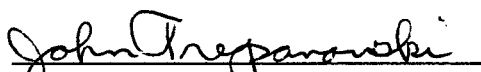
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**APRIL 1992**

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## **1.0 INTRODUCTION**

### **1.1 Authorization**

HALLIBURTON NUS Environmental Corporation is under contract to the United States Navy Contract Number N6472-90-D-1298 to provide administrative and technical services to the U.S. Navy CLEAN (Comprehensive Long-Term Environmental Action Navy) Program. Team subcontractors to HALLIBURTON NUS under this contract are SEC Donohue Inc. and ENSR Consulting and Engineering.

Contract Task Order (CTO) 0002 authorizes HALLIBURTON NUS to conduct a Site Investigation at the Naval Weapons Industrial Reserve Plant (NWIRP) at Calverton, Suffolk County, New York. The plant is located on Long Island, New York, and is operated by Grumman Aerospace Corporation (Grumman) (see Figures 1-1 and 1-2).

### **1.2 Purpose**

The objective of the SI is to obtain environmental information in order to:

- Eliminate from further investigation those sites that pose no definable threat to the environment or to public health under CERCLA.
- Collect data to develop a valid PA score for the sites.
- Document the release or potential release of hazardous substances at each site and determine if additional action is required.

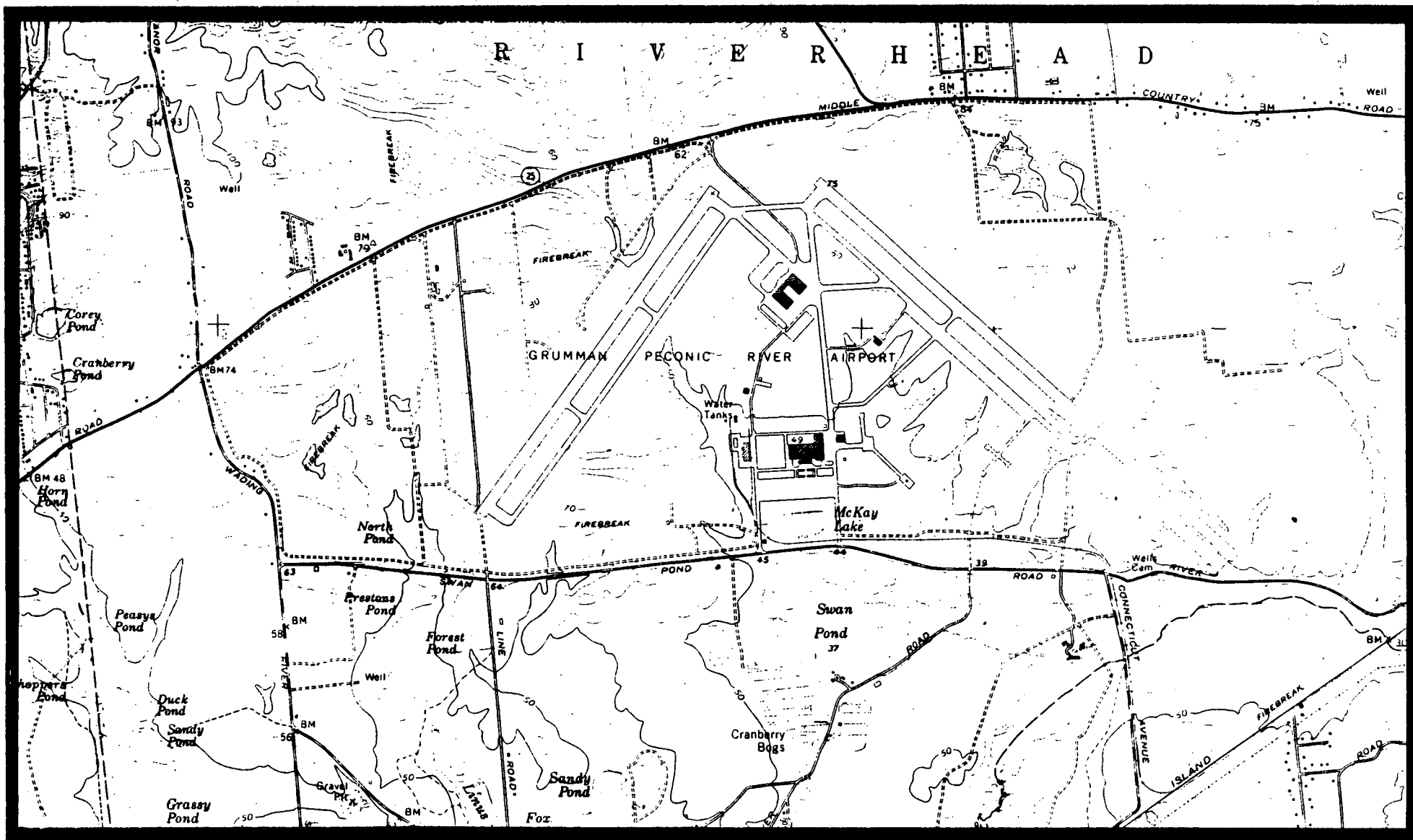
### **1.3 Scope of Work**

HALLIBURTON NUS was tasked to conduct a site investigation of the Navy's Calverton NWIRP. The need for this site investigation resulted from the findings of an Initial Assessment Study completed in December 1986 (Navy [U.S. Department of the Navy] 1986). This study identified six areas requiring additional investigation. Since this study, a seventh area was also considered for investigation because of fuel spills due to tank and equipment failure as well as human error. The fuel spills were identified as having occurred in the fuel depot area. These seven sites are as follows (see Figure 1-3).

- Site 1 - Northeast Pond Disposal Area
- Site 2 - Fire Training Area
- Site 4 - Picnic Grounds Disposal Area
- Site 6A - Fuel Calibration Area
- Site 6B - Engine Runup Area

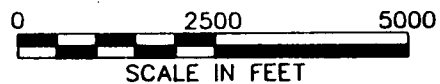


1-3



USGS QUADRANGLE: WADING RIVER 1967

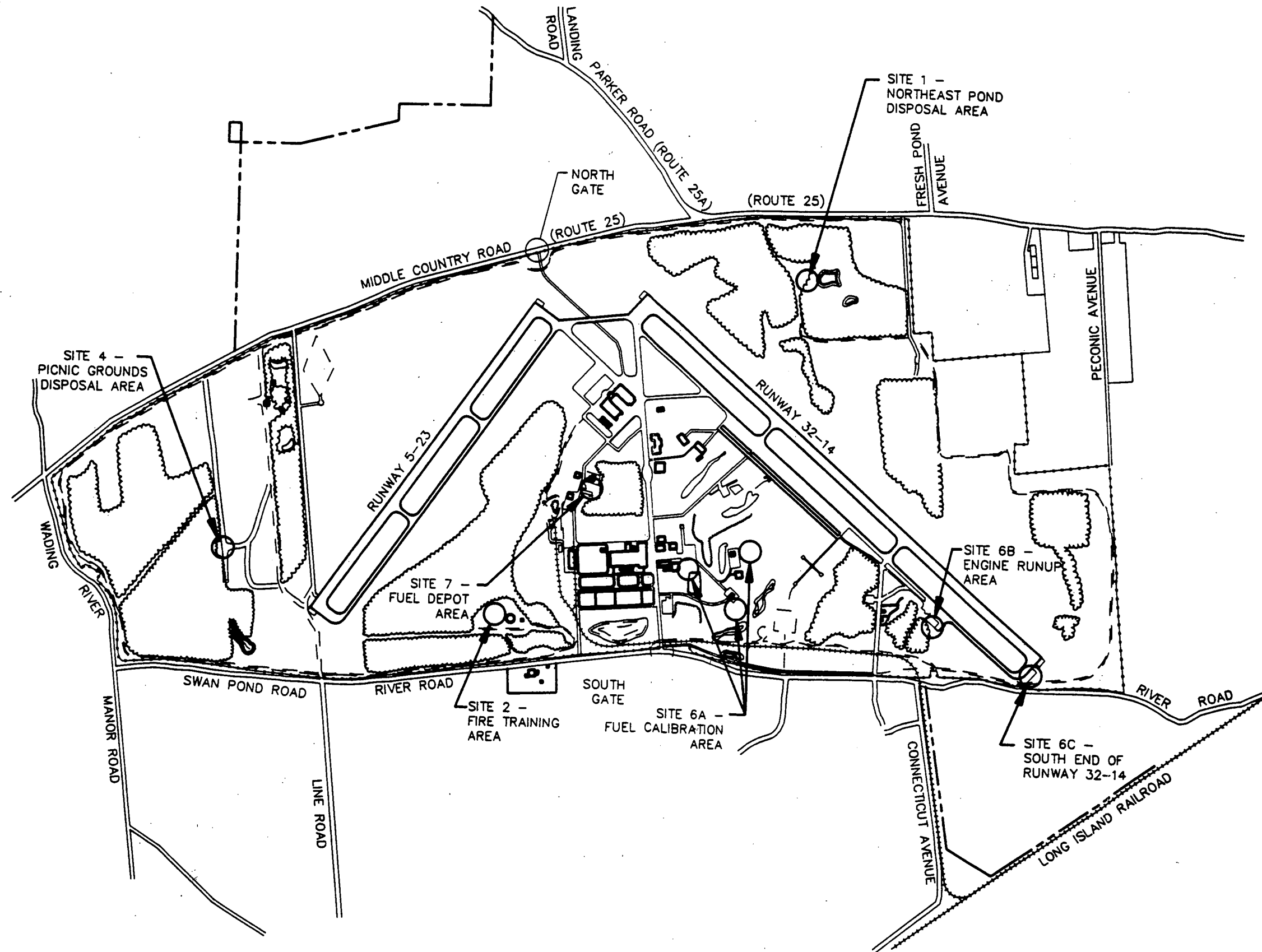
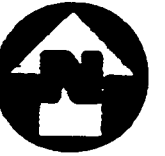
FIGURE 1-2



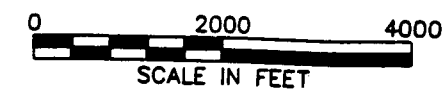
**SITE LOCATION**  
**SITE INVESTIGATION**  
 NWIRP, CALVERTON, NEW YORK



**HALLIBURTON NUS**  
 Environmental Corporation



**LOCATION OF SITES  
SITE INVESTIGATION  
NWRP, CALVERTON, NEW YORK**



**FIGURE 1-3**

Site 6C - South End of Runway 32-14  
Site 7 - Fuel Depot Area

To support the Site Investigation, HALLIBURTON NUS conducted sampling of surface and subsurface soils, groundwaters, sediments, surface waters, and free products. Based on historical data, indicating what types of contaminants that would be expected to be found at each site, the samples were analyzed for volatile organics or benzene, toluene, ethylbenzene, and xylene; semivolatile organics or polyaromatic hydrocarbons; metals and cyanide or lead; and/or pesticides/PCBs.

#### 1.4 Summary

As a follow-up to the U.S. Navy Initial Assessment Study performed in 1986, as well as additional findings since this time, seven sites were investigated at the NWIRP in Calverton, New York. These sites can be classified as either landfill-type sites or sites resulting from documented or suspected historic spills or leaks of fuels, oils, and/or solvents.

The two landfill-type sites are the northeast pond disposal area (Site 1) and the picnic grounds disposal area (Site 4). There are no reports of hazardous material being disposed in either of these sites. The sites considered because of documented or suspected spills or leaks are the fire training area (Site 2), the fuel calibration area (Site 6A), the engine runup area (Site 6B), the south end of Runway 32-14 (Site 6C), and the fuel depot area (Site 7). The presence of free floating products in monitoring wells installed at Sites 2, 6A, and 7, is a direct indication of historic spills or leaks. Site 6B, Site 6C, and the engine runup area and engine test house at Site 6A were considered because of the visual observation of stressed vegetation at these areas. These areas with stressed vegetation correlate to the locations where the exhaust from jet engines are common.

The volatile organics compounds found at one or more of the sites include chlorinated alkanes (e.g., 1,1,1-trichloroethane), chlorinated alkenes (e.g., tetrachloroethene), and aromatic compounds (e.g., benzene and toluene). The semivolatile organic compounds found at one or more of the sites include phthalates and polyaromatic hydrocarbons. The inorganic compounds found at concentration above natural background concentration at one or more sites include chromium, cadmium, lead, copper, zinc, and cyanide.

The most significant contaminants detected in the soils at Site 1 include naphthalene (1,700J ug/kg), PAHs (182,500J ug/kg), cadmium (42.4 mg/kg), chromium (959 mg/kg), copper (1,320J mg/kg), lead (314J mg/kg), nickel (233 mg/kg), and zinc (2,380J mg/kg). Low concentrations of surface water and sediment contamination were also found.

- The soils (including the former coal pile) and contaminated groundwater associated with the Production Wells.

Additional investigations of past practices should also be conducted to evaluate other potential source areas of contamination, including abandoned leach fields throughout the NWIRP.

No additional investigation is recommended for the following areas:

- Site 4.
- The engine runup area and engine test house at Site 6A.
- Sites 6B and 6C.

## 2.0 SITE DESCRIPTION

### 2.1 Site Location

The sites involved in this study are located within the confines of the Calverton Naval Weapons Industrial Reserve Plant (NWIRP) in Calverton, Suffolk County, New York, (see Figures 1-1 and 1-2). The majority of the facility is located within the municipality of Riverhead; a small area on the western side is located within Brookhaven. Calverton is located on Long Island approximately 80 miles east of New York City (USGS, 1967).

The coordinates of the individual sites at the Calverton NWIRP are as follows.

<u>Site</u>	<u>Latitude</u>	<u>Longitude</u>
Northeast Pond Disposal Area	40°55'30"N	72°46'59"W
Fire Training Area	40°54'26"N	72°48'07"W
Picnic Grounds Disposal Area	40°54'42"N	72°49'18"W
Fuel Calibration Area	40°54'40"N	72°47'28"W
Engine Runup Area (Runway 32-14)	40°53'29"N	72°46'27"W
South End of Runway 32-14	40°54'17"N	72°46'05"W
Fuel Depot Area	40°54'50"N	72°47'53"W

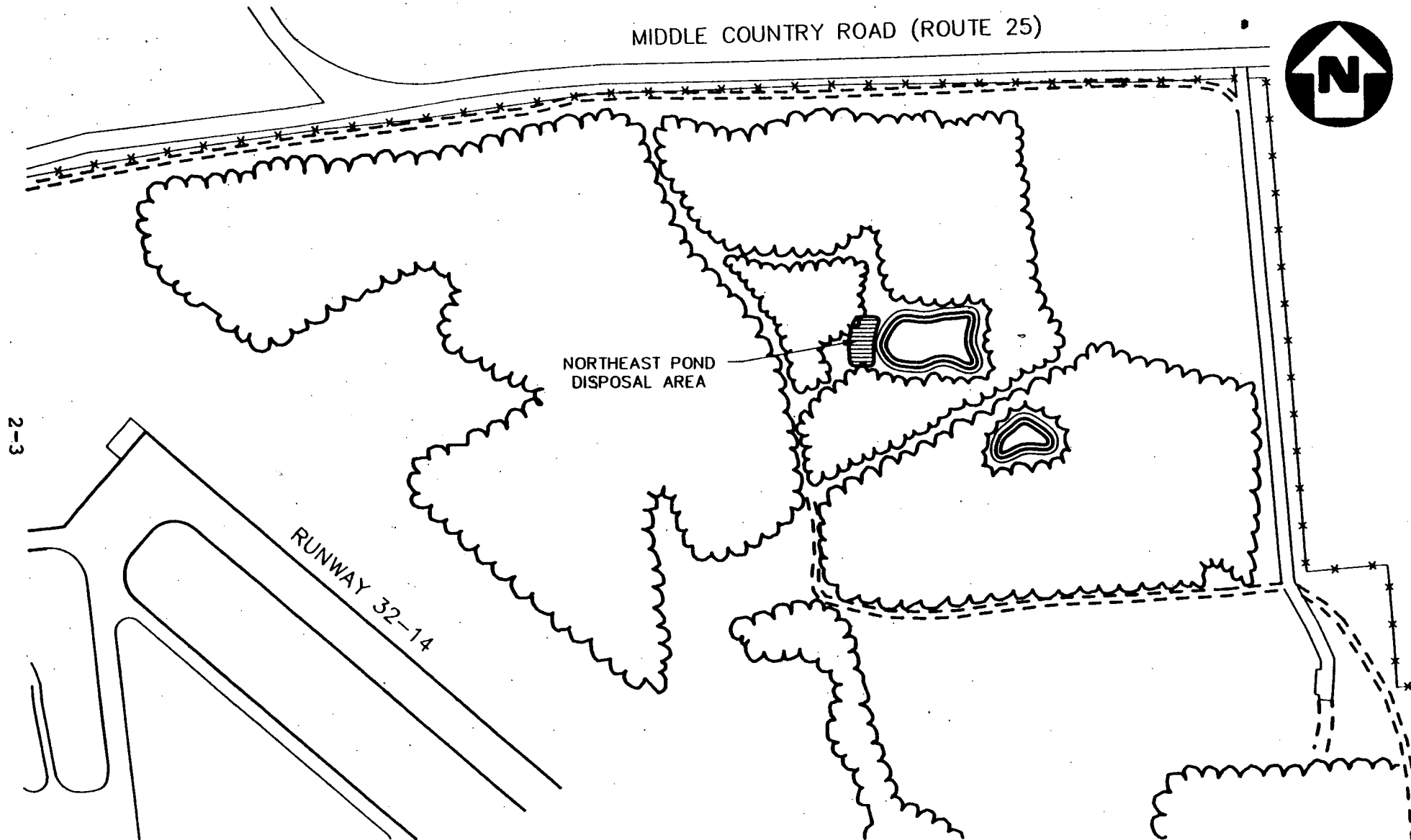
### 2.2 Site Layout

The Calverton facility is approximately 6,000 acres overall in area. The investigated section of the facility is approximately 3,000 acres and is dominated by two large runways (see Figure 1-3). The facility is roughly rectangular in shape and measures, at its greatest distances, 3.65 miles east to west and 1.6 miles north to south (USGS, 1967).

The facility is bordered by Middle Country Road (NY Rt. 25) to the north, agricultural land to the east, River Road to the south, and Wading River Road to the west. The primary features of the facility are two large paved runways, a 7,000-foot runway (Runway 5-23) located on the western half of the site and oriented southwest to northeast, and a 10,000 foot runway (Runway 32-14), located on the eastern half of the site and oriented southeast to northwest. The runways are connected by a 1,250-foot taxiway at the north central section of the facility. Taxiways parallel the inside edges of both runways (see Figure 1-3).

The majority of development at the Calverton facility is located in the central and eastern areas between the two runways. A number of office, laboratory, aircraft and component assembly, warehouse, hanger, and associated support buildings are located in this area.

Each of the individual sites are discussed below.



**SITE LAYOUT**  
**SITE 1 - NORTHEAST POND DISPOSAL AREA**  
**SITE INVESTIGATION**  
**NWIRP, CALVERTON, NEW YORK**

pit, is currently used to store fuels. A 6,000 gallon underground fuel storage tank was located north of the training area prior to 1982 (USGS, 1986; Navy, 1987).

Eighteen groundwater monitoring wells are located in the area of the fire training area, the majority of which are located to the east and southeast of the pit. A groundwater recovery unit, including a pumping well, an oil recovery well, and an oil/water storage tank, is located within a fenced area southeast of the pit at Well W-2.

The eastern portion of the fire training area was partially excavated at an unknown time. A small embankment up to 4 feet high is located along the eastern edge of the area and a dirt access road is located along the southern edge. The fire training area is surrounded by woodlands on all sides. The majority of the areas within the clearing to the west of the training ring are covered by marsh vegetation (USGS, 1967).

#### **2.2.3 Site 4 - Picnic Grounds Disposal Area**

The picnic grounds disposal area is located west of Runway 5-23, approximately 2,500 feet north of River Road and 6,500 feet west of the south gate (see Figure 1-3). The area is located on the western side of a "T" intersection of two dirt roads (see Figure 2-3). One road is oriented south to north and ends at Rt. 25 approximately 3,000 feet north of the disposal area. The second road begins at the picnic grounds disposal area and trends east for approximately 500 feet to the ammunition demolition area. The road then turns to the north-northeast and enters the picnic area after extending approximately 1,500 feet (USGS, 1967).

The disposal area is approximately 60 feet in length from north to south, and 40 feet in width, east to west. The area is level and is at the same elevation as the roadway. On its western edge, it is excavated a maximum of 4 feet into the underlying soils. The area is wooded on all sides. A small clearing exists on the eastern side of the intersection (USGS, 1967; Navy, 1986).

#### **2.2.4 Site 6A - Fuel Calibration Area**

The fuel calibration area is located approximately 2,000 feet north of River Road and 2,000 feet west of the south gate (see Figure 1-3). The fuel calibration area consists of a concrete pad (approximately 250 feet by 250 feet), the engine test house, the hush house (an aircraft test building), the engine runup area, and the surrounding areas (see Figure 2-4). (The engine runup area in Site 6A is a separate engine runup area from Site 6B) (USGS, 1967).

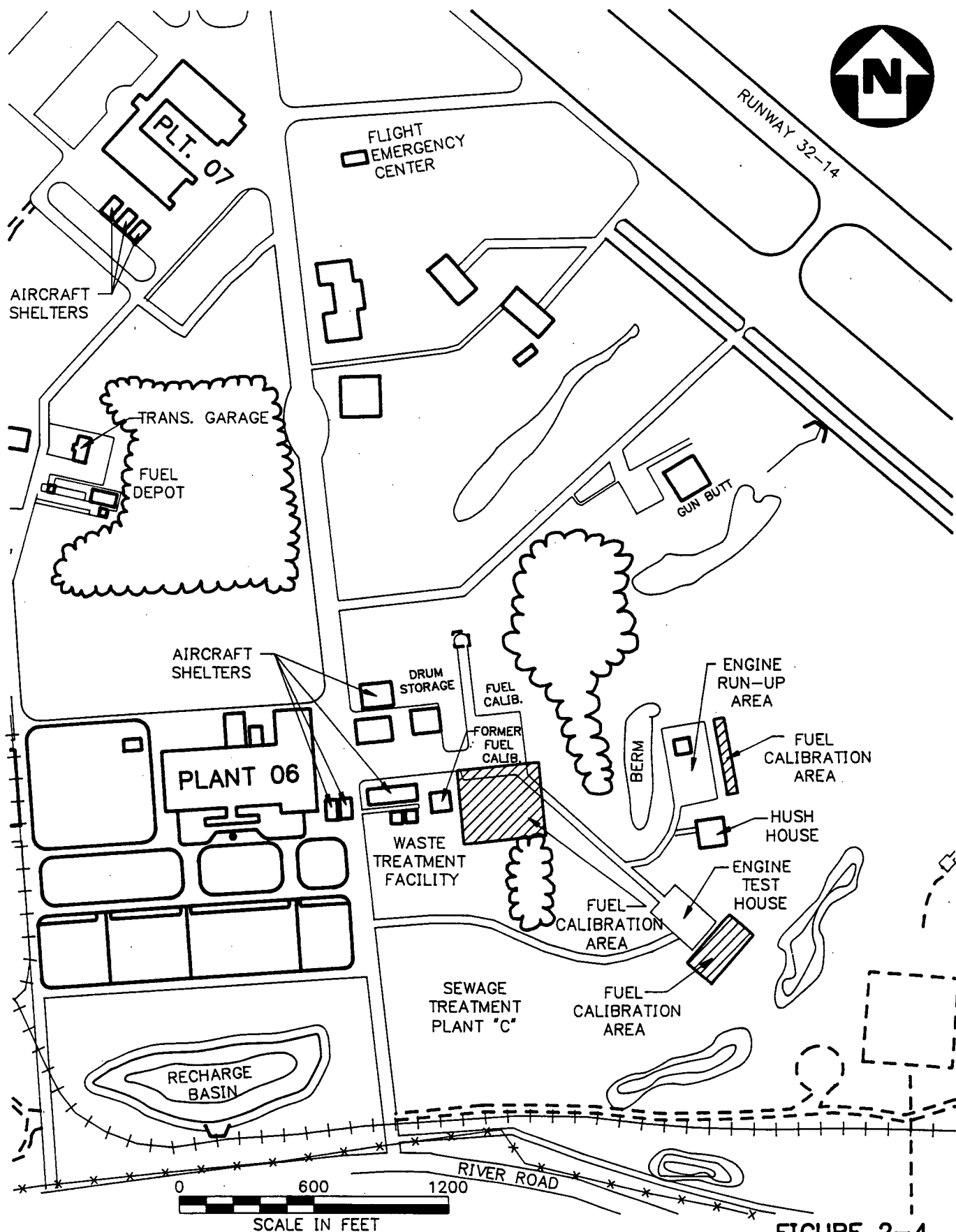


FIGURE 2-4

**SITE LAYOUT**  
**SITE 6A - FUEL CALIBRATION AREA**  
**SITE INVESTIGATION**  
**NWIRP, CALVERTON, NEW YORK**



**HALLIBURTON NUS**  
*Environmental Corporation*



#### **2.2.5 Site 6B/6C - Engine Runup Area/South End of Runway 32-14**

The runway engine runup area and the south end of Runway 32-14 are located 4,500 feet and 6,500 feet, respectively, east-southeast of the fuel calibration pad (see Figure 1-3). The engine runup area is a 500- by 100-foot concrete area adjacent to the taxiway on the southwest edge of Runway 32-14. It is located approximately 2,000 feet from the south end of Runway 32-14 (see Figure 2-5) (USGS, 1967).

The engine runup area is open to the taxiway and is surrounded by a metal blast fence on the three remaining sides. The area beyond the blast fence is open and grass covered. The area southwest of the runup area has been excavated to a depth of up to 6 feet (USGS, 1967; Navy, 1986).

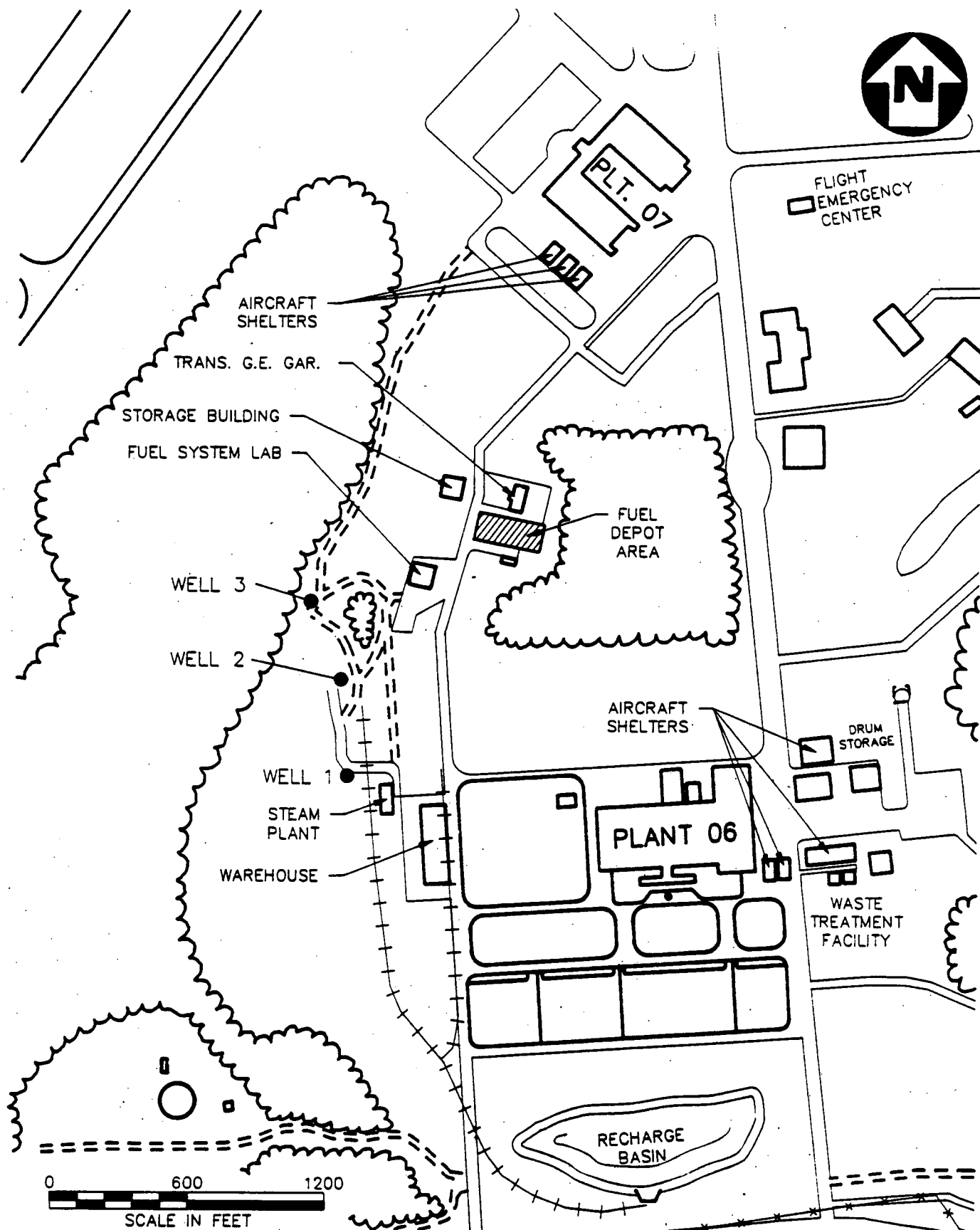
Site 6C is at the southwest corner of the runway, at the end of the concrete taxiway. Aircraft turn in this area to stage for take-off. The site is located approximately 200 feet north of River Road and 8,200 feet east of the south gate (USGS, 1967).

#### **2.2.6 Site 7 - Fuel Depot Area**

The fuel depot area is located approximately 3,000 feet north of the south gate, near the geographic center of the Calverton facility (see Figure 1-3). It is located at the eastern side of the road leading from the south gate and is approximately 2 acres in area, measuring 150 feet in width and 400 feet in length (see Figure 2-6). The principal features of the fuel depot are a large concrete trucking-parking area covering the southern half of the depot, and two underground fuel storage tank areas: a 60- by 120-foot area covering the northeast area of the depot, and a 40- by 150-foot area covering the north-central area. The underground storage tank (UST) areas are primarily soil covered, with scattered concrete pads surrounding fill and vent pipes. A pump house is located at the western edge of the fuel depot, and a maintenance garage is located at the southeastern corner. The area is fully fenced (USGS, 1967; U.S. Department of the Navy, 1986).

Monitoring wells are located both within the fuel depot area and in the surrounding areas. A total of 34 monitoring wells are located in the area (Navy 1986; MPG, 1990-1991).

A garage and paved parking area for trucks and equipment used by the Grumman transportation department are located north of the fuel depot. Areas to the east and south are wooded. A paved roadway leading from the south gate is adjacent to the depot to the west; a storage building and the fuel system laboratory building are located west of the road (USGS, 1967; Navy, 1986).



**SITE LAYOUT**  
**SITE 7 - FUEL DEPOT AREA**  
**SITE INVESTIGATION**  
**NWIRP, CALVERTON, NEW YORK**

**FIGURE 2-6**



**HALLIBURTON NUS**  
*Environmental Corporation*

## 2.4.2 Specific Site History

This section presents the specific activities that are known or suspected to have occurred in each of the seven sites.

### 2.4.2.1 Site History/Description

Until 1984, the northeast pond disposal area was used primarily for the disposal of demolition debris such as concrete, brick, wood, and other construction materials. A final soil cover was placed over the disposed material in 1984. According to available information, other materials in the fill include aircraft sections and junked aircraft assembly tooling, office materials and furniture, pallets, and paint cans. The wreckage of several aircraft may be present in the area. Hazardous materials are not known to have been purposefully disposed of in the area. However, it is reported in the 1986 Initial Assessment Study (IAS) that any of the following wastes may be present at the sites: petroleum, oils and lubricants (POLs), asphalt paving material, halogenated and nonhalogenated solvents, and paint sludges (Navy, 1986).

The waste materials were placed in a depression adjacent to the pond, and may have been used to fill portions of the pond. Soil borrowed from an adjacent hillside was used as cover material, creating a level area approximately 2 acres in size, with steep embankments up to 20 feet in height leading into the pond from the eastern edge of the disposal area (Navy, 1986).

No exposed wastes were observed on the surface or eastern embankment of the fill area during the site inspection. A small amount of debris, such as concrete chunks, wood scraps, and metal pieces, was exposed on the embankment leading into the woods from the south edge of the fill area. According to the IAS, approximately 7,500 cubic yards of material may have been disposed in this area.

### 2.4.2.2 Site 2 - Fire Training Area

The fire training area has been used by Grumman and Navy crash rescue crews as a training area since 1955, and possibly as early as 1952. According to the IAS, soil disturbances in the area were continuously evident in historical photographs. Before 1982, activities at the site consisted of clearing an area up to 100 feet or more in diameter and creating an earthen berm surrounding the area. The bermed area was then filled with a layer of water. Waste fuels, oils, and periodically, waste solvents were floated on the water and ignited. The IAS reports that up to 450 gallons of waste solvent were mixed with up to 2,100 gallons of waste fuel per year for use in the training exercises. Aircraft sections were sometimes placed in the area to simulate actual crash conditions. After 1975, waste solvents were reportedly no longer mixed with the material to be ignited; only waste fuel and oil was used. In 1982,

and plywood. There is no evidence of hazardous waste disposal in the area. However, because of the extensive period of operation, unknown hazardous compounds may have been disposed in the area (Navy, 1986; USDA, 1947).

At the time of the site inspection, the disposal area was fully covered by a level soil fill. The area was slightly excavated into the surrounding terrain. No wastes were visible on the surface. Soil borings west of the access road unearthed materials including plywood and wood scraps, as well as plastic.

#### 2.4.2.4 Site 6A - Fuel Calibration Area

The fuel calibration and related facilities are used in the testing of aircraft fuel and engine systems. Aircraft fuel delivery systems are pressurized with fuel in the calibration area to test for leaks. The testing may have resulted in frequent, small, fuel spills to the area's pavement (Navy, 1986; Ohlman, 1985).

The present calibration area is a concrete pad, approximately 2 acres in size, located at the east-central edge of the industrial area of the facility. At this time, the majority of activity takes place on the eastern edge of the pad. In previous years, activity was centered along the southern edge of the pad. An abandoned fuel distribution set-up, including piping, manifolds, and filters, is located south of the concrete pad. The original fuel calibration area at the facility was located approximately 250 feet southwest of the present area. The original area is now grass covered (Navy, 1986).

Three ancillary structures to the fuel calibration area are located to the southeast. These include the covered engine runup area, the hush house, and the engine test house. The engine runup area is used to test jet engines and fuel system for leaks while operating the engines at elevated speeds. An excavated area several acres in size is located east of the engine runup area blast fence; its use is unknown. The hush house is a specially constructed building that allows aircraft engines to be operated at high speeds while containing the associated noise. The engine test house is outfitted to operate jet engines before installation in aircraft (Navy, 1986).

The primary environmental concern at the fuel calibration area is the spillage of aircraft fuels. According to the IAS, as many as 230 gallons of fuel are recorded to have been spilled in these areas. The majority of the spillage is expected to be concentrated in the areas surrounding the main fuel calibration pad (See Appendix B) (Navy, 1986; Ohlman, 1985).

The grass field located immediately south of the present fuel calibration area (and east of the former calibration area) is the former location of a septic system leach field. The system was

of the facility. These activities have resulted in groundwater contamination by fuels, which may have occurred by tank and pipe leakage, overfilling, and spills (Navy, 1986; Ohlman, 1985).

## **2.5 Regulatory Action History**

According to available information, the site has not been subject to extensive regulatory action. A report entitled Environmental/Energy Survey, NWIRP Calverton New York, dated December 3, 1976, was prepared by Mantech of New Jersey Corporation for the National Environmental Support Office (See Appendix A) (Mantech, 1976). The report outlined industrial practices and waste generation at the facility along with energy conservation-related topics. The report also offered suggestions to help minimize waste generation and reduce the potential for spillage of hazardous materials. During the 1980's, the facility made numerous spill reports to the New York State Department of Transportation (NYSDOT). NYSDOT forwarded those reports to the New York State Department of Environmental Conservation (NYSDEC). The majority of these spills were accidental discharges to paved surfaces during aircraft fueling operations. NYSDOT occasionally sent inspectors to monitor these spills (Navy, 1986, 1976; Ohlman, 1985).

The spill at the fire rescue training area in August 1982 was described in a September 7, 1982, memorandum (See Appendix B). The spill was given identification No. 820923 by NYSDOT. The memo states that the spill and cleanup actions were monitored by NYSDOT and NYSDEC personnel (Ohlman, 1985).

The facility was the subject of a study entitled Initial Assessment Study of NWIRP Bethpage, New York, and NWIRP Calverton, New York, dated December 1986 and prepared by Rogers Golden and Halpern in association with BCM Eastern, Inc. for the Naval Energy and Environmental Support Activity. The report summarized previous waste handling practices at the facility and identified sites for confirmation studies. The majority of these sites were investigated during the site inspection (Navy, 1986).

In October 1987, after receiving monitoring data of the groundwater at the fire training area, NYDEC requested that Grumman install additional monitoring wells in the area to further assess the contamination. NYDEC also requested that Grumman install a recovery system for contaminated groundwater and develop a groundwater contour map (NYSDEC, 1987). Similar requests were made for the fuel calibration area in 1987 and for the fuel depot area in 1989.

## **2.6 Remedial Action**

A limited amount of remedial action related to environmental contamination has been conducted at the facility to date. The thrust of earlier studies at the facility was the identification and investigation of potentially contaminated areas (See Appendices

### 3.0 ENVIRONMENTAL SETTING

#### 3.1 Water Supply

Groundwater serves as the source of drinking water for the population residing within a 4-mile radius of the site. Private wells, wells on two government-owned facilities (Grumman Aerospace Corporation [Calverton NWIRP] and Brookhaven National Lab), and three municipal water systems (Riverhead Water District, Shorewood Water Company, and Suffolk Water Company) supply the drinking water needs of the study area. The location of these wells is provided in Plate 1. Calculations supporting the apportioned populations serving each of these wells is provided in Appendix H.

##### 3.1.1 Private Wells

The nearest private wells to the facility are located 0.3 miles south, 0.7 miles east, 0.25 miles north, and 0.25 miles west of the facility; no information is available regarding construction details on these wells. Private home wells are the sole source of supply to residents southeast, south, and southwest of the Calverton facility. Concentrated housing developments to the west and northwest, including the areas of Ridge and Lake Panamoka, respectively, are currently served by home wells but will soon have access to public water supplies. Similarly, residences in areas north of the facility are not currently connected with municipal water but will soon have access to public water supplies (USGS, 1967; Pendzick, 1991; Anderson, 1991).

In addition to the private home wells, Grumman as a private company, owns two wells within 0.1 miles south of the plant near the main gate. The following information is available regarding the Grumman wells.

<u>Plant No.</u>	<u>Depth (feet)</u>	<u>Capacity (GPM)</u>
8	147	79
78	151	79

Even though these two well are classified as private wells, because of the relationship between Grumman and the NWIRP, the apportioned population served by these wells is considered with the onsite production wells. Analytical testing of these wells did not reveal the presence of contamination.

##### 3.1.2 Government-Owned Facilities

The Calverton NWIRP and Brookhaven National Labs are the only two government-owned facilities within a four-mile radius of the site (USGS, 1967).

<u>Well Number</u>	<u>Depth (feet)</u>	<u>Capacity (gpm)</u>	<u>Location</u>
4	95-147	1,200	4.5 miles SW
5	--	--	3 miles SW
6	98-150	1,200	4.6 miles SW
7	99-150	1,200	4.8 miles SW
10	91-140	1,200	3.6 miles SW
11	93-142	1,200	3.55 miles SW
12	92-137	1,200	3.5 miles SW

Wells 10 and 11 were removed from service in 1989 because of contamination by 1,1,1-trichloroethane above the New York State Drinking Water Standard of 5 ug/l. Average 1,1,1-trichloroethane concentrations found in quarterly sampling conducted in 1989 on Wells 10 and 11 were 5.8 ug/l and 7.0 ug/l, respectively. An average concentration of 8.3 ug/l of 1,1,1-trichloroethane was found in samples collected from these wells in three consecutive weeks during November 1989. In 1991, only Wells 4, 6, 7, and 12 have been used for potable water supply. The apportioned population served by the system is 202 residents, and 996 workers. The apportioned population is determined by multiplying the total population served by the system by the percentage of total system pumpage volume provided by wells within the 4-mile radius. The most recent yearly system pumpage rates available were used in the calculation (DOE, 1990; Brookhaven National Laboratory, 1991).

### 3.1.3 Municipal Water Systems

The Riverhead Water District (RWD) and the Shorewood Water Company (SWC) are the only two municipal water suppliers with wells located within a 4-mile radius of the Calverton NWIRP.

The RWD serves 5,700 customers (22,500 residents) from nine groundwater wells. Two of these wells, Nos. 7-1 and 7-2, are located within a 4-mile radius of the site; the remaining wells in the system are located beyond the 4-mile radius. The depths, capacities, and locations of the wells are listed below (Pendzick, 1991a and b).

<u>Well Number</u>	<u>Depth (feet)</u>	<u>Capacity (gpm)</u>	<u>Location</u>
1	105	750	4.75 miles E
2	140	1,000	4.6 miles E
3	125	1,000	4.75 miles E
4-1	720	1,000	4.4 miles ENE
4-2	225	1,200	4.4 miles ENE
5-1	250	1,200	6.5 miles ENE
5-2	460	1,200	6.5 miles ENE
7-1	780	300	1.9 miles N
7-2	490	1,340	1.9 miles N

The Suffolk Water Company serves a small number of residents (70 homes) located approximately 3.5 miles west of the facility, to the southwest of the intersection of Middle County Road and William Floyd Parkway. Suffolk's wells are located greater than 4 miles from the facility.

#### 3.1.4 Summary

The total number of residents supplied by sources of groundwater within the 4-mile radius of the facility is as follows:

<u>Distance</u>	<u>Description</u>	<u>Number of Residents</u>
0-1/4 mile	Calverton Wells	2,800
	Domestic Wells	18
1/4 - 1/2 mile	Domestic Wells	137
1/2-1 mile	Domestic Wells	359
1-2 mile	RWD Wells	2,096
	Domestic Wells	1,757
2-3 mile	Domestic Wells	982
3-4 mile	SWC Wells	2,763
	Brookhaven Lab. Wells	1,198
	Domestic Wells	465

#### 3.2 Surface Water

The Calverton facility is located in an area underlain by permeable glacial material and characterized by limited surface water drainage features. Normal precipitation at the facility is expected to infiltrate rapidly into the soil.

The majority of the facility is located within the Peconic River drainage basin. Extensive wetland areas and glacially formed lakes and ponds are located southwest and south of the facility. The eastward-flowing Peconic River is located approximately 500 feet south of the facility at its closest point. Based on topography, groundwater is expected to flow southward and discharge to the ponds and wetland areas, and ultimately be received by the Peconic River via overland flow. The Peconic River flows 1.95 stream miles eastward from Runway 32-14 into Peconic Lake. The Peconic is tidally influenced below the dam on the Peconic Lake, located 3.2 stream miles from the site, and discharges to Peconic Bay which is 8.5 stream miles from the facility.

Major surface water features at the Calverton facility include McKay Lake, the northeast pond, and the north pond. McKay Lake is a groundwater recharge basin located north of River Road, midway along the southern site border. The northeast pond is located at the northeast corner of the site, and North Pond is located at the southwest corner of the facility. Several small drainage basins exist near the fuel calibration area. All of these ponds and



containing two small ponds. These ponds are located approximately 1,500 feet south of the fuel calibration area.

Surface water runoff from the remaining study areas (Sites 2, 6B, 6C and 7) is expected to infiltrate into the soil. Runoff from the fire training area flows to the southeast; the nearest potential receiving water is Swan Pond, located 2,000 feet to the southeast. Runoff from the fuel depot flows eastward via a very shallow slope into woodlands. No direct drainage pathway to a surface water body exists. Runoff from the Runway 32-14 runup area is expected to flow southeastward into the shallow excavated area adjacent to the runup area. Surface water runoff for the area at the end on the Runway 32-14 is expected to flow approximately 500 feet south to the Peconic River. The elevation of the end of the runway is approximately 20 feet above the river in this area.

A long string of interconnected ponds exists approximately 3,500 feet west of the western edge of the Calverton Facility. These ponds, including Horn Pond, Peasys Pond, Duck Pond, Sandy Pond, Grassy Pond, and Jones Pond, begin immediately south of NY Rt. 25 and flow approximately 2.5 stream miles to the Peconic River. The ponds are all less than 20 acres in size. These water bodies may receive infiltrated runoff and limited surface water runoff from the far western areas of the facility.

A limited number of small wetland areas exist on the Calverton facility. North pond is classified by the U.S. Department of the Interior, Fish and Wildlife Department as a palustrine emergent wetland. The western half of the 2 acre northeast pond is classified as palustrine, forested/scrub/shrub wetland. The drainage basin receiving runoff from the fuel calibration area is classified as palustrine scrub/shrub/emergent wetland (U.S. Department of the Interior, 1980).

Extensive areas of wetlands exist south of the facility adjacent to the Peconic River and its tributaries, including Swan Pond. The dominant wetland classifications of these areas are palustrine forested, palustrine scrub/shrub, and palustrine emergent. Areas of lacustrine open water wetland exist along the Peconic River. Approximately 7 stream miles from the site, areas of estuarine intertidal wetlands begin, which continue along the Peconic River into Great Peconic Bay. Predominant classifications in the tidal areas include emergent, flat and beach/bar wetlands.

The total wetland frontage within the 15-mile surface water drainage pathway is greater than 15 miles (U.S. Department of the Interior, 1980).

### **3.3 Regional Geology**

NWIRP Calverton lies within the Atlantic Coastal Plain Physiographic Province. Generally, this region can be

The unconsolidated sediments beneath the site unconformably overlie crystalline bedrock. The crystalline bedrock consist of schist, gneiss, and granite. The regional dip is to the south and southeast. All of the geologic units dip in these directions, although to varying degrees (McClymonds and Frank, 1972).

### **3.3.1 Site-Specific Geology**

A soil boring and sampling program was completed as part of the site investigation. This program consisted of drilling testing borings using hollow-stem auger and split-spoon sampling techniques through the vadose zone sediments to the top of the water table at various locations throughout the NWIRP. Because of the shallow depth to the water table beneath the activity, the depths of the borings range from 7 to 22 feet. Consequently, the Upper Glacial Formation was the only unit encountered/sampled.

The borings reveal that the sites are predominantly underlain by coarse to very coarse sediments of probable glaciofluvial origin. Two dominant lithologies were encountered. The upper lithofacies is a brownish to orange-brown coarse sand which contained varying but always minor amounts of clay and silt. Where present, these lithofacies typically extended from near the surface to a depth of approximately 4 to 5 feet. The upper zones of these lithofacies most likely grade into the lower soil horizons, but the cut-and-fill or disturbed nature of the sites made it difficult or impossible to identify soil zones. Underlying this sand is a highly uniform, light tan to buff colored, coarse to very coarse grained sand with infrequent gravel. The thickness of this facies is unknown, as no underlying facies were penetrated.

### **3.3.2 Soils**

The soils underlying the NWIRP were discussed in detail in the IAS (Navy, 1987). Each site studied as part of this investigation occurs in an area that, by the nature of the site activity, involved the disturbance of the soil. It is unlikely that the native soil exists as mapped beneath any of the sites. This is due to fill activity (the picnic grounds and the pond disposal area), soil removal activity (the fire training area), or the cut-and-fill or grading activity associated with construction at the other sites.

### **3.3.3 Hydrogeology**

The unconsolidated sediments that underlie the NWIRP are generally coarse-grained with high porosities and permeabilities. These factors create aquifers with high yields and high transmissivities.

The Upper Glacial Formation, the Magothy Formation, and the Lloyd Sand are the major regional aquifers. The Upper Glacial and the Magothy aquifers are of principal importance in Suffolk County

The overall direction of groundwater flow beneath the NWIRP is uncertain. As discussed in the IAS, the NWIRP is situated very near a regional groundwater divide. The IAS hypothesized that the activity actually straddled this divide, with groundwater beneath the northern half of the activity flowing to the north and groundwater beneath the southern half of the activity flowing to the south. Examination of the topographic map, however, seems to indicate that the general slope of the surface and the surface drainage over the entire activity is predominantly to the south. Assuming that the configuration of the water table in an unconfined aquifer is similar to the surface topography, it appears that the flow of groundwater in the unconfined zone beneath the entire activity is generally to the south. Localized undulations or changes in topography at the individual sites may alter this flow direction, especially in the shallowest aquifer zones. The Peconic River basin is the likely discharge point for most of the groundwater in the shallow aquifer zones (Upper Glacial and upper Magothy aquifers). Although the vertical gradients beneath the NWIRP are not known, it seems likely that a portion of the groundwater beneath the activity may migrate downward and recharge the deeper zones of the Magothy, and thus enter the regional groundwater system (Navy, 1986).

Based on observations during the site investigation and well elevations reported by MPC, the groundwater flow directions beneath the site are similar to those stated in the IAS. During the site investigation, the apparent groundwater flow direction at the fire training area is to the southeast and the groundwater flow direction at both the fuel calibration area and the fuel depot area is to the east. The IAS was based on a larger set of monitoring wells and indicated local groundwater flows directions of southwest, southeast, and southeast, respectively (MPC, 1991).

The facility production wells undoubtedly affect the flow pattern of the local groundwater, but to an unknown extent. These wells are between 140 and 155 feet deep. The individual well draw down and the radius of the resultant cone of depression formed by the pumping of these wells are not known (Fetter, 1976; Sedburn, 1970a and b).

### **3.4 Climate and Meteorology**

The facility is located in an area classified as a humid-continental climate. Its proximity to the Atlantic Ocean and Long Island Sound add maritime influences to this classification (National Oceanic and Atmospheric Administration, 1982).

The average yearly temperature at the NOAA Riverhead Research Station, located 4.5 miles northeast of the site, is 52.2 F, with a mean maximum average monthly temperature of 73.3 F in July and a minimum average monthly mean temperature of 30.9 F in January.

### 3.7 Critical Environments

According to the U.S. Department of the Interior, Fish and Wildlife Service, no federally listed endangered or threatened species reside within a 4-mile radius of the study area. Transient individuals of endangered species, such as the Bald Eagle (*Haliaeetus leucocephalus*), may occur within the study area (Corin, 1991).

Information provided by NYSDEC and the New York Natural Heritage program indicated that several New York State endangered and threatened animal species exist within the study area. The most notable, tiger salamander (*Ambystoma tigrinum*), may occur on site in the ponds adjacent to the fuel calibration area, and possibly the northeast pond. Other species include the northern cricket frog (*Acris crepitans*) and the least tern (*Sterna Antillarum*). Numerous additional endangered and threatened plant species occur within the study area, (Buffington, 1991; Scheibel, 1991).

According to the information supplied by NYSDEC, the wetland areas surrounding the Peconic River, including Swan Pond, are the location of significant habitat for many endangered and threatened animals and plants (Buffington, 1991; Scheibel, 1991).

#### **4.0 FIELD TRIP REPORT**

##### **4.1 Site Personnel**

The field activities for the Calverton site inspection occurred between July 8, 1991, and August 2, 1991. HALLIBURTON NUS personnel Randy Patarcity, Environmental Engineer, and Kevin Kilmartin, Geologist, performed all site-related activities. Environmental sample collection began on July 15, 1991 and ended July 31, 1991. Uni-Tech Drilling Company of Newfield, New Jersey, was present on site from July 23, 1991, until July 30, 1991 to conduct soil borings and collect split-spoon samples (See Appendix F for the daily field activity reports).

##### **4.2 Weather Conditions**

Weather conditions throughout the field activities were generally sunny, with temperatures ranging from 75 to 100°F. Limited precipitation occurred on July 25, 1991, and heavy fog the morning of July 26, 1991.

##### **4.3 Sampling Activities**

Samples of groundwater, soils, sediment, and surface water were collected from one or more of the sites. The samples were analyzed for volatile organic scans or benzene, toluene, ethylbenzene, and xylene (BTEX); semivolatile organic scans or polycyclic aromatic hydrocarbons (PAHs); total metals/cyanide or lead; and/or PCBs. The analytes selected for each sample location were based on the potential for contaminants to be present at each site as outlined in the IAS. Table 4-1 summarizes the sample matrices and analytical testing at each site.

##### **Groundwater**

The total number of groundwater sampling points was 22, including 19 monitoring wells and 3 production wells. A duplicate sample, a matrix spike sample, and a matrix spike duplicate sample was collected at two of the sample locations. Additionally, a total of four samples of floating free product were obtained from the monitoring wells.

##### **Soil Borings**

Twenty-four soil borings were completed during the site inspection. In most cases, three split-spoon samples were collected per boring including a 0- to 2-foot sample, a 5- to 7-foot sample, and a sample at the soil/groundwater interface. The total number of soil sample locations collected was 67. Duplicate samples were

collected at 10 of these locations, and a matrix spike and a matrix spike duplicate samples at 7 locations.

#### Surface Water

Two surface water aqueous samples were collected; a duplicate sample, a matrix spike sample, and a matrix spike duplicate sample were collected at one of the locations.

#### Sediment

A total of 5 surface water drainage pathway sediment samples were collected from 5 locations; two of the locations matched aqueous samples locations.

#### QA/QC Samples

The remaining samples collected during the site inspection include 11 trip blanks (supplied by NET-Atlantic laboratory), 10 equipment rinsate samples, and 3 field blank samples.

Chain-of-Custody forms and boring log sheets for the individual samples collected during the site inspections can be found in Appendix E. Sample log sheets for the samples collected during the site inspection can be found in Appendix G.

## **5.0 WASTE TYPES AND QUANTITIES - GENERAL**

### **5.1 General Activities**

The areas investigated during the site inspection can be separated into two types of sites, landfills and liquid spill areas. The northeast pond disposal area and picnic disposal area were reportedly used for the landfill disposal of primarily demolition-type debris; however, both areas may have also received hazardous materials over the years. The other areas investigated were subject to the discharge of liquids to the soils and groundwater via spills or leaks of fuel oils and/or solvents.

In reviewing the data in subsequent sections, the term "Soil Boring" refers to the boring location. The term "Soil" refers to a specific depth in that boring. References to "Soils" without any letter designation, indicate that the sample was obtained at the surface. References to "Soils" with a "B" qualifier always indicate that the sample was obtained at the soil/ groundwater interface. Generally, "Soils" with an "A" qualifier indicate that the sample was obtained below the surface but at a depth above the groundwater table. The only exception to this general rule for the "A" qualifier is five of the soil samples collected at Site 6A - Fuel Calibration Area (Soils 13A, 14A, 15A, 16A, and 17A). Because of the shallow depth to groundwater, these five soils represent both the intermediate zone soils and the soil/ groundwater interface soils.

The "C" qualifier indicates that the sample is a field duplicate of the surface soil with the same sample number designation. For all the other sample matrices (groundwater, surface water, production water, and sediments) the "A" designation indicates that the sample result is a field duplicate.

### **5.2 Preliminary Data Screening**

The complete analytical data base of the samples collected is presented in Appendix J. Since inorganics parameter are normally found in the environment, a preliminary screening of the inorganic data was conducted.

This preliminary screening consisted of establishing a baseline concentration for inorganic chemicals in the soil samples. Inorganics at this concentration would be considered as natural background conditions. Since background samples were not collected at Calverton, the results of analysis on background samples obtained at the NWIRP in Bethpage, New York were used to develop the background level for Calverton. The data was statistically analyzed and the 95% upper limit of background results was selected. Detected concentrations of inorganics above this 95% upper limit would be expected to result from contamination at the site. Calculations are provided in Appendix I. The calculated

TABLE 5-1

**BACKGROUND CONCENTRATIONS  
FOR INORGANIC CHEMICALS IN SOILS  
SITE INVESTIGATION  
NWIRP CALVERTON, NEW YORK**

PARAMETER	CONCENTRATION (mg/kg)
Aluminum	12,600
Antimony	None detected <5.5
Arsenic	3.6
Barium	35
Beryllium	None detected <0.96
Cadmium	None detected <1.2
Calcium	621
Chromium	13
Cobalt	None detected <5.6
Copper	None detected <5.0
Iron	11,400
Lead	7.8
Magnesium	1,740
Manganese	167
Mercury	0.15
Nickel	None detected <6.2
Potassium	690
Selenium	None detected <1.3
Silver	None detected <0.31
Sodium	190
Thallium	None detected <0.82
Vanadium	18
Zinc	20
Cyanide	None detected <2.6



## **6.0 WASTE TYPES AND QUANTITIES - SITE 1 - NORTHEAST POND DISPOSAL AREA**

### **6.1 Site History/Description**

Until 1984, the northeast pond disposal area was used primarily for the disposal of demolition debris such as concrete, brick, wood, and other construction materials. A final soil cover was placed over the disposed material in 1984. According to available information, other materials in the fill include aircraft sections and junked aircraft assembly tooling, office materials and furniture, pallets, and paint cans. The wreckage of several aircraft may be present in the area. Hazardous materials are not known to have been purposefully disposed of in the area. However, it is reported in the 1986 Initial Assessment Study (IAS) that any of the following wastes may be present at the sites: petroleum, oils and lubricants (POLs), asphalt paving material, halogenated and nonhalogenated solvents, and paint sludges (Navy, 1986).

The waste materials were placed in a depression adjacent to the pond, and may have been used to fill portions of the pond. Soil borrowed from an adjacent hillside was used as cover material, creating a level area approximately 2 acres in size, with steep embankments up to 20 feet in height leading into the pond from the eastern edge of the disposal area (Navy, 1986).

No exposed wastes were observed on the surface or eastern embankment of the fill area during the site inspection. A small amount of debris, such as concrete chunks, wood scraps, and metal pieces, was exposed on the embankment leading into the woods from the south edge of the fill area. According to the IAS, approximately 7,500 cubic yards of material may have been disposed in this area.

### **6.2 Field Activities**

Sampling activities at the northeast pond disposal area consisted of collecting 12 soil samples at 4 soil boring locations; 2 sediment samples; and 2 surface water samples. See Figure 6-1 for the location of each of the sample points at the northeast pond disposal area. Each of the samples was analyzed for volatile organics, semivolatile organics, metals, and cyanide. Additionally, the surface water samples were analyzed for polychlorinated biphenyls (PCBs) and pesticides.

Relevant field observations are as follows.

- A black silty-clay material was discovered in Soil Borings 01 through 04. A black cinder-like material was identified in Soil Borings 01 and 04.
- A blue granular material was observed in the split spoon collected from 15 to 17 feet in Soil Boring 1 (Soil-01B). This sample represents the soils at the soil/groundwater interface. Also, an HNU reading of 20 ppm over the background reading was obtained from the headspace of a sample jar collected at this location.
- No visible contamination was observed in the surface water aqueous and sediment samples collected from the pond.
- Groundwater was encountered at a depth of 15 to 17 feet in Soil Borings 01 and 04, which are located closest to the pond. Groundwater was encountered at 20 to 22 feet in Soil Borings 02 and 03.

### **6.3 Analytical Results**

#### **6.3.1 Soil Results**

The four soil borings in this area confirmed the depth of fill. Fill material was found in Soil Boring 01 from near the surface to near the water table at a depth of about 16 feet. Fill material was also found in Soil Boring 04 starting at a depth of about 1 foot. At a depth of 5 feet, there was no fill material observed. Observation of the soils in the other two soil borings at this site did not indicate the presence of fill material. Items discovered in the soil cuttings included wood, metal and fiberglass scraps, a black clay-like substance, a black cinder-like substance, and small amounts of a blue granular material (in Soil-01B).

The contaminants found in the soils at the northeast pond disposal area and their concentrations are summarized in Table 6-1 and individual sample results are presented in Table 6-2.

The results of chemical testing of the soiling boring samples indicated limited volatile organic contamination at this site. Elevated concentrations of semivolatile organic compounds and tentatively identified compounds (TICs) were identified in several of the soil borings, particularly Soil Boring 01.

PARAMETERS	CONCENTRATION RANGE			
	CRQL/CRDL	DEPTH 0 TO 2 FEET	DEPTH 5 TO 7 FEET	SOIL/ GROUNDWATER INTERFACE
Vanadium (mg/kg)	10	ND	BB to 39.2J	BB to 85.2J
Zinc (mg/kg)	4	28.1J to 139J	BB to 385J	BB to 2,380J
Cyanide (mg/kg)	2	ND to 5.5	ND to 4.4	ND to 5.7

J - Estimated.

ND - None detected.

BB - Below background (See Table 5-1).

CRQL/CRDL-Contract Required Quantitation Limit/Detection Limit.

PAHs = Polynuclear aromatic hydrocarbons: benzo[a]pyrene, dibenzofuran, naphthalene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, benz[a]anthracene, benzo[g,h,i]perylene, indeno[1,2,3-c,d]pyrene, chrysene, pyrene, fluoranthene, anthracene, phenanthrene, fluorene, acenaphthene, acenaphthylene, and 2-methylnaphthalene.

PARAMETER	CRQL/ CRDL	SOIL 01	SOIL 01A	SOIL 01B	SOIL 02	SOIL 02A	SOIL 02B	SOIL 03	SOIL 03C	SOIL 03A	SOIL 03B	SOIL 04	SOIL 04C	SOIL 04A	SOIL 04B
Copper (mg/kg)	5	149J	153J	1,320J	26.3J	184J		104J	46.3J			11.4J	12.4J		
Iron (mg/kg)	20					15,100									
Lead (mg/kg)	0.6	42.5J	68.9J	314J	33.9J	62.4J		19.9J	30J						
Manganese (mg/kg)	3					482									
Mercury (mg/kg)	0.1	0.51	0.88			0.17									
Nickel (mg/kg)	8	14.7	35.9	233		118			9.9						
Silver (mg/kg)	2		4.9J	115J		2.2J		2.3J							
Vanadium (mg/kg)	10			85.2J		39.2J									
Zinc (mg/kg)	4	118J	206J	2,830J	81.5J	385J		139J	123J						
Cyanide (mg/kg)	2	5.5		5.7	4.1	4.4									

(1) A blank indicates that the sample was analyzed, but not detected above background concentrations.

TIC = Tentitively identified compounds.

PAH = Polynuclear aromatic hydrocarbons.

J = Estimated.

CRQL/CRDL - Contract Required Quantitation Limit/Detection Limit.

TABLE 6-3

**SURFACE WATER CONTAMINANTS AND CRITERIA (ug/l)  
 SITE 1 - NORTHEAST POND DISPOSAL AREA  
 SITE INVESTIGATION  
 NWIRP CALVERTON, NEW YORK**

PARAMETER	CRDL	SW 01	SW 02	SW 02A	FEDERAL AWQC
Aluminum	200	1,350	90.3	115	87
Chromium	10	63.3			11 (Hex) 210 + (+3)
Copper	25	14.9			12+
Iron	100	3,870			1,000
Lead	5	8.1	4.4	4	3.2+
Zinc	20	221J			110+
Cyanide	10	83.4J		12.5J	5.2

- (1) A blank indicates that the sample was analyzed, but that the result was below the water quality criteria.  
 (2) Sample SW 02A is a duplicate sample of sample SW 02.

AWQC = Chronic Freshwater Ambient Water Quality Criteria (EPA 1976, 1980a, 1987b, 1988b)

Hex = Hexavalent

(+3) = Trivalent chromium

+ = Hardness-dependent criterion; assumed 100 mg/l.

CRDL = Contract Required Detection Limit

## 7.0 WASTE TYPES AND QUANTITIES - SITE 2 - FIRE TRAINING AREA

### 7.1 Site History/Description

The fire training area has been active since 1955 and possibly as early as 1952. Waste fuels and occasionally waste solvents were floated on water in bermed earth-lined areas and ignited for fire fighting practice. The use of waste solvents was halted in approximately 1975. A concrete lined circle was constructed in 1982 to prevent fuels from infiltrating into the soil.

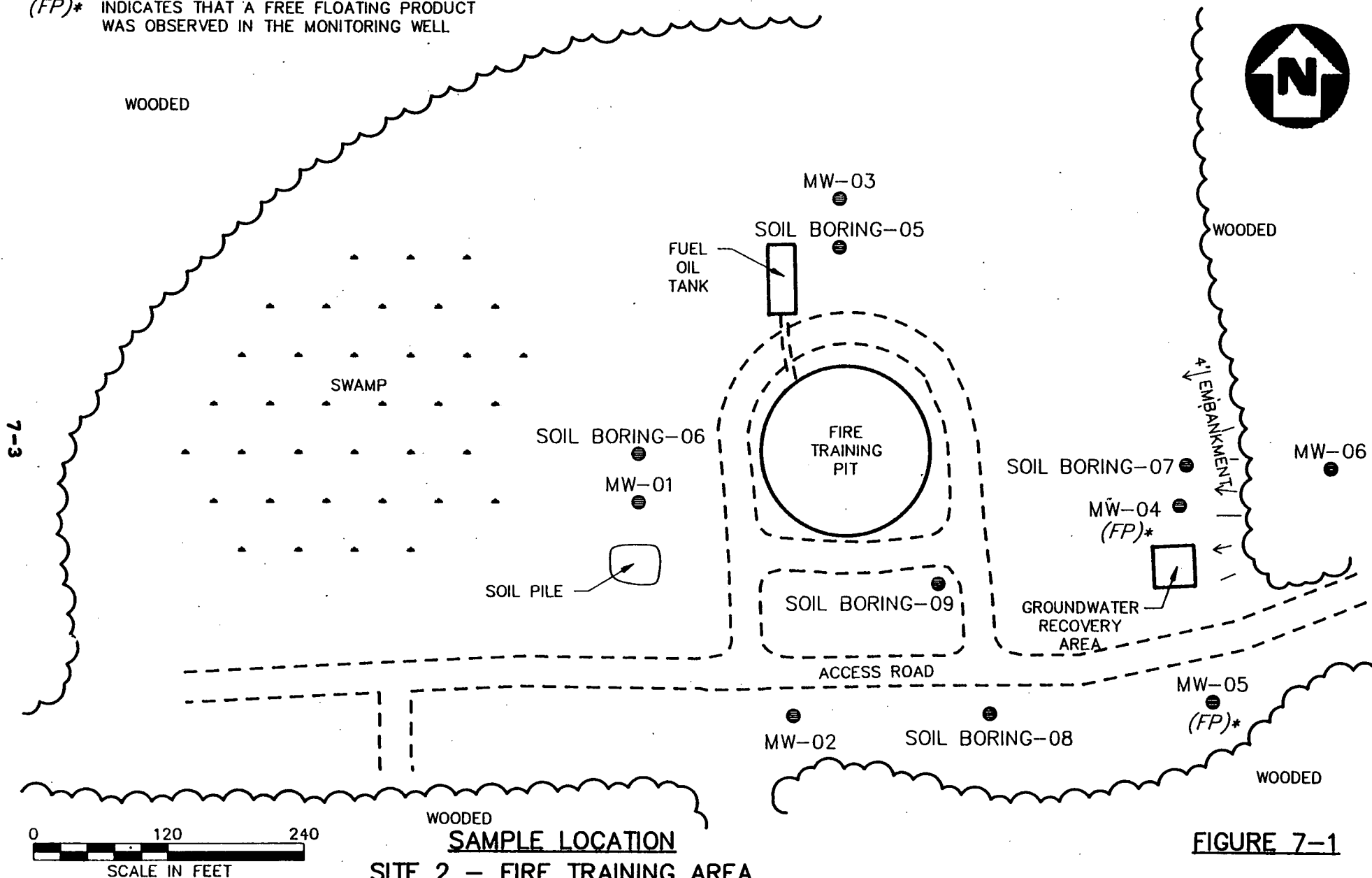
The primarily fuels burned in the fire training area were waste heating fuels, diesel fuel, and jet fuel such as JP-4 and JP-5. Solvents known to have been mixed with these fuels in the past include toluene, methyl ethyl ketone, and lacquer thinner. The IAS estimates that 450 gallons per year of solvent were disposed of between 1953 and 1975. Approximately 1,500 to 2,000 gallons per year of waste fuels and oils have been disposed of at the area since its inception.

Two fuel spill incidents have occurred in the fire training area. In August 1982, an unknown amount of fuel leaked to the soil surface via piping from a 6,000 gallon underground storage tank. According to the IAS, the tank was not filled to capacity at that time. Approximately 327 cubic yards of soil were excavated from the spill area immediately following the spill. A second spill in 1983 of approximately 300 gallons of No. 2 fuel oil occurred after a leak in the outflow piping of the 1,000-gallon, above-ground tank that replaced the underground tank. The amount of soil removed after this spill is not known. A spill on the edge of the fire training pit in approximately 1990/1991 led to the excavation of approximately 32 cubic yards of soil in early 1991.

The eastern portion of the fire training area was partially excavated at an unknown time. A small embankment up to 4 feet high is located along the eastern edge of the area and a dirt access road is located along the southern edge. The fire training area is surrounded by woodlands on all sides. The majority of the areas within the clearing to the west of the training ring are covered by marsh vegetation (USGS, 1967).

The fire training area is located on the eastern side of a 9-acre clearing in the south central area of the facility (see Figure 1-3). A circular, concrete pit in the southeast corner of the clearing is used to contain liquids for the fire training exercises (see Figure 2-2). The pit is approximately 50 feet in diameter and is located about 750 feet north and 1,000 feet west of the facility south gate. A concrete curb approximately 8 inches high forms the walls of the pit. A 1,000-gallon, steel, above-ground, fuel storage tank, located approximately 75 feet north of the training pit, is currently used to store fuels. A 6,000 gallon underground

(FP)\* INDICATES THAT A FREE FLOATING PRODUCT WAS OBSERVED IN THE MONITORING WELL



**SAMPLE LOCATION**  
**SITE 2 - FIRE TRAINING AREA**  
**SITE INVESTIGATION**  
**NWIRP, CALVERTON, NEW YORK**

**FIGURE 7-1**

TABLE 7-1

**RESULTS OF ANALYSIS - SOILS SUMMARY  
SITE 2 - FIRE TRAINING AREA  
SITE INVESTIGATION  
NWIRP CALVERTON, NEW YORK**

PARAMETER	CONCENTRATION RANGE			
	CRQL/ CRDL	DEPTH 0 TO 2 FEET	DEPTH 5 TO 7 FEET	SOIL/ GROUNDWATER INTERFACE
Chloroethane (ug/kg)	10	ND	ND	ND to 230J
1,1-Dichloroethane (ug/kg)	5	ND	ND	ND to 6
1,1,1-Trichloroethane (ug/kg)	5	ND	ND	ND to 3J
Trichloroethene (ug/kg)	5	ND to 4J	ND to 4J	ND
Tetrachloroethene (ug/kg)	5	ND to 12	ND	ND to 580
Toluene (ug/kg)	5	ND to 33J	ND to 4,300	ND to 770
Ethylbenzene (ug/kg)	5	ND to 12	ND to 1,500	ND to 350J
Xylene (ug/kg)	5	ND to 51	ND to 15,000	ND to 3,400
Total PAHs (ug/kg)	330	ND to 1943J	ND to 31310J	ND to 28540J
Aldrin (ug/kg)	0.05	ND to 36	ND	ND
Endrin (ug/kg)	0.10	ND	ND to 14J	ND to 9J
4,4'-DDT (ug/kg)	0.10	ND to 27	ND to 16	ND
Aroclor 1248 (ug/kg)	0.5	ND to 8,500	ND	ND to 200
Aroclor 1260 (ug/kg)	1.0	ND to 300J	ND to 2,100	ND to 1,600
Antimony (mg/kg)	12	BB to 13.2J	BB	BB
Cadmium (mg/kg)	1	BB to 1.7J	BB	BB
Copper (mg/kg)	5	BB	BB to 5.3	BB
Lead (mg/kg)	0.6	BB to 35.7J	BB to 41.6J	BB
Zinc (mg/kg)	4	BB to 43.9		

ND - None Detected

BB - Below Background

J - Estimated

CRQL/CRDL - Contract Required Quotation Limit/Detection Limit



TABLE 7-2  
RESULTS OF ANALYSIS - SOILS  
PAGE TWO

PARAMETER	CRQL	SOIL 08C	SOIL 08A	SOIL 08B	SOIL 09	SOIL 09A	SOIL 09B
Chloroethane (ug/kg)	10						230J
1,1 - Dichloroethane (ug/kg)	5			6			
1,1,1-Trichloroethane (ug/kg)	5			3J			
Chloroethane (ug/kg)	10						230J
Trichlorethene (ug/kg)	5						
Tetrachloroethene (ug/kg)	5			1J	12	580	
Toluene (ug/kg)	5				33J	4,300	770
Ethylbenzene (ug/kg)	5				12	1,600	350J
Xylene (ug/kg)	5				51	15,000	3,400
Total PAHs (ug/kg)	330	591J			1,934J	31,310J	28540J
Total TIC PAHs (ug/kg)							12,000
Aroclor 1248 (ug/kg)	0.5	8,500		200			
Aroclor 1260 (ug/kg)	1.0				300	2,100	1,600
Aldrin (ug/kg)	0.05						
Endrin (ug/kg)	0.1					14J	9J
B-BHC (ug/kg)	0.05	18					
4,4-DDT (ug/kg)	0.1					16	
Antimony (mg/kg)	12		13.2J				
Cadmium (mg/kg)	1				1.7J		
Copper (mg/kg)	5						
Lead (mg/kg)	0.6				35.7J		
Zinc (mg/kg)	4				43.9		

(1) A blank indicates that the sample was analyzed but not detected above background.

TIC = Tentatively identified compounds.

PAH = Polynuclear aromatic hydrocarbons.

C = Duplicate result.

J = Estimated.

CRQL/CRDL = Contract Required Quantitation Limit/Detection Limit

TABLE 7-4

RESULTS OF ANALYSIS - GROUNDWATER (ug/l)  
 SITE 2 - FIRE TRAINING AREA  
 SITE INVESTIGATION  
 MWIRP CALVERTON, NEW YORK

PARAMETER	CRQL/ CRDL	MW 01	MW 02	MW 03	MW 04	MW 04 FP	MW 05	MW 05 FP	MW 06
Chloroethane	10						4,500	4,000	
1,1-Dichloroethane	5	53J	12	4J	8	3J	1,700	1,800	
1,1,1-Trichloroethane	5	20J	11	24	50	8	130J		1J
1,2-Dichloroethene	5	26J	7				790	670	
Trichloroethene	5	5J	1J	10	5				
Tetrachloroethene	5	5J		1J	2J				
Toluene	5	56J		2J			320J	190J	
Ethylbenzene	5	10J		12					
Xylenes	5	120J		86			300J		
1,2-Dichlorobenzene	10						74		
Methylphenol	10	12J			6J		73		
Total PAHs	10	154J							
Total TIC PAHs				10			70		
Total Phthalates	10	32J							
TICs		P	P	P	P	P	P		
4,4'-DDT	0.1			0.1J					
Aroclor 1260	1	7.9		0.83J	0.87J				

### 7.3.3 Free Product

The results of the chemical analysis of the free product layer found in two of the monitoring wells sampled (MW-04 and MW-05) are presented below and indicate that significant concentrations of chlorinated volatile organics are present. The free product was described as a yellow-clear oily liquid. A limited number of significant TICs were identified. TICs by their nature are generally unknown with little or no data available as to the relative toxicity of the individual compounds. As a result, minimal conclusions can be derived from these results.

#### FREE PRODUCT

PARAMETER	CONCENTRATION (ug/l)
Chloroethane	ND to 4,000
1,1-Dichloroethane	3 to 1,800
1,2-Dichloroethene	ND to 670
1,1,1-Trichloroethane	ND to 8
Toluene	ND to 190
Lead	65.5 to 86.5

### 7.4 Conclusions and Recommendations

The results of the sampling and analysis confirmed the presence of contaminated soil and groundwater at Site 2. The primary soil contaminants are chlorinated and nonchlorinated volatile organics, with lesser concentrations of semivolatile organics and inorganics. Low concentrations of PCBs and pesticides were also found.

Additional investigation is recommended at this site to characterize the nature and extent of both soil and groundwater contamination.

## **8.0 WASTE TYPES AND QUANTITIES - SITE 4 - PICNIC GROUNDS DISPOSAL AREA**

### **8.1 Site History/Description**

The picnic grounds disposal area was active before the construction of the Calverton facility. Aerial photographs taken in 1947 show the disposal area, along with several adjacent dwellings. The disposal area is approximately 40 x 60 feet in size, and was excavated to a depth of approximately 8 feet. The IAS reports that the following materials are known to have been placed in the disposal area: framing lumber, snow fencing, steel wall studs, steel stairways and ladders, tubular metal items, foam billets, furniture, and plywood, concrete, demolition material, and carpeting. No evidence of hazardous waste disposal exists.

The picnic grounds disposal area is located west of Runway 5-23, approximately 2,500 feet north of River Road and 6,500 feet west of the south gate (see Figure 1-3). The area is located on the western side of a "T" intersection of two dirt roads. One road is oriented south to north and ends at Rt. 25 approximately 3,000 feet north of the disposal area. The second road begins at the picnic grounds disposal area and trends east for approximately 500 feet to the ammunition demolition area. The road then turns to the north-northeast and enters the picnic area after extending approximately 1,500 feet (USGS, 1967).

The disposal area is approximately 60 feet in length from north to south, and 40 feet in width, east to west. The area is level and is at the same elevation as the roadway. On its western edge, it is excavated a maximum of 4 feet into the underlying soils. The area is wooded on all sides. A small clearing exists on the eastern side of the intersection (USGS, 1967; Navy, 1986).

### **8.2 Field Activities**

Sampling activities at the picnic grounds disposal area consisted of collecting nine soil samples at three soil boring locations. See Figure 8-1 for the location of each of the sample points at the picnic grounds disposal area. Each of the samples was analyzed for volatile organics, semivolatile organics, metals, cyanide, PCBs, and pesticides.

Relevant field observations are as follows.

- Wood, plywood and plastic scraps were observed in the soil cuttings obtained from Soil Boring 10. A split-spoon sample could not be obtained from the 5- to 7-foot depth because the spoon could not be advanced. Based on the behavior of the

spoon, it is suspected that wooden debris may have been present at this depth.

- No significantly elevated HNU readings were recorded.
- Groundwater was encountered at depths of 15.5 feet, 15.75 feet, and 15.25 feet in Soil Borings 10, 11, and 12, respectively.

### **8.3 Analytical Results**

The results of chemical analysis of the soil samples collected at the picnic grounds disposal area are presented in Table 8-1. These results did not reveal evidence of significant contamination by organic or inorganic compounds. The concentrations of contaminants detected were generally low, near background levels for inorganics or near the detection limits for organics. Levels of unknown semivolatile organic TICs ranged from approximately 8,150 to 23,240 ug/kg. TICs by their nature are generally unknown with little or no data available as to the relative toxicity of the individual compounds. As a result, minimal conclusions can be derived from these results.

### **8.4 Conclusions and Recommendations**

The relatively low concentrations of organic and inorganic contaminants at the site as well as the observations of fill material in the area confirm that disposal activities have occurred at this location in the past. However, the number and concentration of contaminants detected were relatively low, indicating that significant quantities of hazardous materials are probably not present.

Based on the absence of significant contamination, no additional investigation in this area is recommended.

## 9.0 WASTE TYPES AND QUANTITIES - SITE 6A - FUEL CALIBRATION AREA

### 9.1 Site History/Description

The fuel calibration area has been active since the construction of the facility in the early 1950s. The area has moved slightly over the years; the original fuel calibration area is approximately 250 feet southwest of the present area. The focus of activity in the present area shifted from the southern to the eastern edge of the concrete pad at an unknown time.

According to the IAS, periodic spills of jet fuels, including JP-4 and JP-5, have occurred throughout the operation, mostly due to small fuel system leaks or accidental spillage during refueling. Much of this material was spilled to the concrete surface; however, small amounts may have reached the surrounding soil. Over 230 gallons of fuel are known to have spilled in this area during the 1980's. The majority of spilled fuel and contaminated soil was reportedly cleaned up.

At the time of the site inspection, little evidence of fuel spillage was present at any of the fuel-calibration-related areas. Stressed vegetation was present in the area adjacent to the southern edge of the fuel calibration pad, in the area beneath the old fuel piping and manifolds.

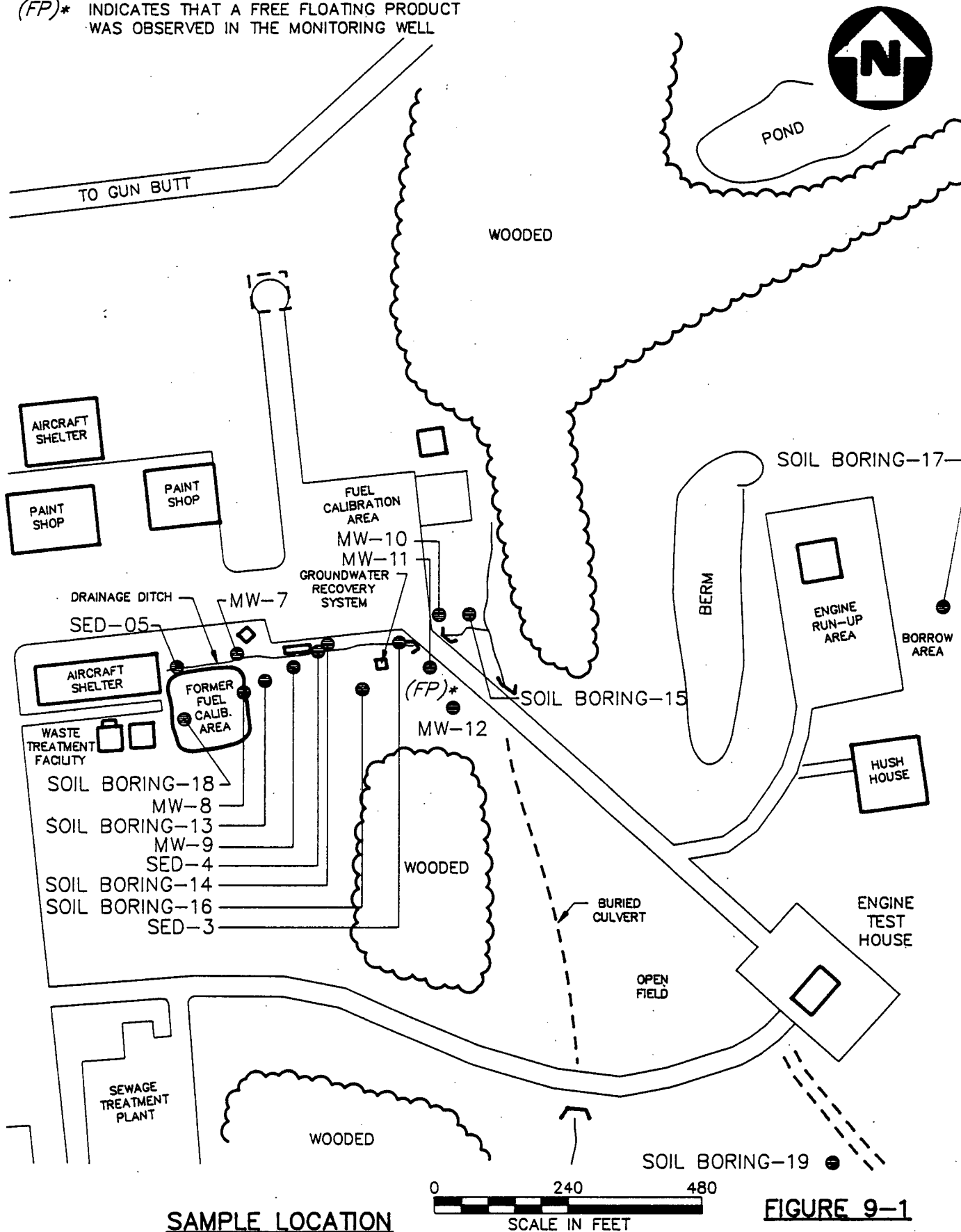
The fuel calibration area is located approximately 2,000 feet north of River Road and 2,000 feet west of the south gate (see Figure 1-3). The fuel calibration area consists of a concrete pad (approximately 250 feet by 250 feet), the engine test house, the hush house (an aircraft test building), the engine runup area, and the surrounding areas. (The engine runup area in Site 6A is a separate engine runup area from Site 6B) (USGS, 1967).

The eastern edge of the concrete pad is currently used for fuel calibration activities. The southern edge of the pad was formerly used for the same activity; a shed, piping, and fuel filtering devices are still located in the area (USGS, 1967; Navy, 1986).

Structures related to the fuel calibration pad include the engine test house, the hush house, and the engine runup area, all of which are connected to the pad by a road leading from its southeast corner. The engine test house is located 750 feet to the southeast, the hush house 600 feet to the east-southeast, and the engine runup area approximately 500 feet to the east (USGS, 1967).

An open field, approximately 10 acres in area, is located immediately south of the calibration pad and is included as part of Site 6A. An older fuel calibration area was located at the northwestern corner of the field, in an area now partially covered by a waste treatment facility. No physical evidence exists of the former calibration area. An area east of the wastewater treatment

(FP)\* INDICATES THAT A FREE FLOATING PRODUCT WAS OBSERVED IN THE MONITORING WELL



**SAMPLE LOCATION**  
**SITE 6A - FUEL CALIBRATION AREA**  
**SITE INVESTIGATION**  
**NWIRP, CALVERTON, NEW YORK**

0 240 480  
 SCALE IN FEET

**FIGURE 9-1**

TABLE 9-1

**RESULTS OF ANALYSIS - SOILS SUMMARY  
SITE 6A - FUEL CALIBRATION AREA  
SITE INVESTIGATION  
NWIRP CALVERTON, NEW YORK**

COMPOUNDS	CONCENTRATION RANGE			
	CRQL/CRDL	DEPTH 0 to 2 FEET	DEPTH 5 to 7 FEET	SOIL/ GROUNDWATER INTERFACE
Methylene Chloride (ug/kg)	5	ND to 1J	ND to 1J	ND
1,1,1- Trichloroethane (ug/kg)	5	ND	*	ND to 7,400J
Toluene (ug/kg)	5	ND to 7J	*	ND to 1,300J
Ethylbenzene (ug/kg)	5	ND to 130	*	ND to 2,700J
Xylene (ug/kg)	5	ND to 700	*	ND to 17,000J
Naphthalene (ug/kg)	330	ND to 1,400J	*	ND to 3,100
Lead (mg/kg)	3	BB to 21.2J	BB	BB

ND - None Detected

BB - Below Background (See Table 5-1)

J - Estimated.

\* Because of the shallow water table, unsaturated subsurface soil samples were not collected at Soil Borings 13, 14, 15, 16, and 17. Only 0- to 2-foot and soil/groundwater interface samples were collected at these locations.

CRQL/CRDL - Contract Required Quantitation Limit/Detection Limit.



TABLE 9-2  
RESULTS OF ANALYSIS - SOILS  
PAGE TWO

PARAMETER	CRQL	SOIL 16C	SOIL 16A	SOIL 17	SOIL 17C	SOIL 17A	SOIL 18	SOIL 18C	SOIL 18A	SOIL 18B	SOIL 19	SOIL 19A	SOIL 19B
Methylene Chloride (ug/Kg)	5					1J	1J						
1,1,1-Trichloroethane (ug/Kg)	5												
Toluene (ug/Kg)	5												
Ethylbenzene (ug/Kg)	5												
Xylene (ug/Kg)	5												
Total PAHs (ug/Kg)	330												
Total TIC PAHs (ug/Kg)													
Total TIC Phthalates (ug/Kg)													

(1) A blank indicates that the sample was analyzed but not detected above background.

TIC = Tentatively identified compounds.

PAH = Polynuclear aromatic hydrocarbons.

C = Duplicate result.

J = Estimated.

CRQL/CRDL = Contract Required Quantitation Limit/Detection Limit.

**TABLE 9-3**

**RESULTS OF ANALYSIS - GROUNDWATER SUMMARY  
SITE 6A - FUEL CALIBRATION AREA  
SITE INVESTIGATION  
NWIRP CALVERTON, NEW YORK**

PARAMETER	CRQL/CRDL (ug/l)	CONCENTRATION RANGE (ug/l)
Chloroethane	10	ND to 2,600
1,1-Dichloroethane	5	ND to 300
1,1,1-Trichloroethane	5	ND to 23
Benzene	5	ND to 4J
Toluene	5	ND to 140
Xylene	5	ND to 450
Lead	3	33.5 to 1,740

ND - None Detected

\* - Lead samples are unfiltered.

J - Estimated.

CRQL/CRDL - Contract Required and Quantitation Limit/Detection  
Limit.

concentration of TICs detected. TICs by their nature are generally unknown with little or no data available as to the relative toxicity of the individual compounds. As a result, minimal conclusions can be derived from these results.

#### **9.3.3 Free Product Results**

The sample of free product from MW-11 was not found to be contaminated by specific listed organic compounds, but did contain elevated levels of lead (218 ug/l). The free product was observed to be slightly brown with a strong kerosene odor. TIC concentrations in the monitoring well free product sample MW-11 were approximately 164,000 ug/l in the volatiles organic scan and 8,810,000 ug/l in the semivolatile organic scan. TICs by their nature are generally unknown with little or no data available as to the relative toxicity of the individual compounds. As a result, minimal conclusions can be derived from these results.

#### **9.3.4 Sediment Results**

Three sediment samples were collected from the drainage ditch paralleling the southern edge of the fuel calibration pad. The ditch drains both the fuel calibration area and the grass field to the south. The downstream location, sediment sample Sed-03, had an orange iron-like staining adjacent to the oil/water tank separation outfall and at the end of the culvert. The staining in the ditch near the oil/water separator reportedly resulted from a break in the piping early in 1990 (USGS, 1967; Navy, 1986; MPG, 1990-1991).

The results of the chemical analysis are presented in Table 9-5 and indicate that there is no significant volatile and semivolatile organic contamination of the sediments. Elevated lead concentrations were identified in sediment sample Sed-05, the upstream sample. Semivolatile organic TIC concentrations ranged from approximately 4,170 to 21,240 ug/kg, with the highest concentration found in sediment sample Sed-04. TICs by their nature are generally unknown with little or no data available as to the relative toxicity of the individual compounds. As a result, minimal conclusions can be derived from these results.

#### **9.4 Conclusions and Recommendations**

The results of the sampling and analysis confirmed the presence of significant soil and groundwater contamination at the fuel calibration area of Site 6A. The primary contaminants found were chlorinated and nonchlorinated volatile organics and semivolatile organics. Significant lead contamination of the groundwater was also observed.

TABLE 9-5

RESULTS OF ANALYSIS - SEDIMENTS  
SITE 6A - FUEL CALIBRATION AREA  
SITE INVESTIGATION  
NWIRP CALVERTON, NEW YORK

PARAMETER	CRQL/ CRDL	SED 03	SED 04	SED 05
Methylene Chloride (ug/kg)	5		1J	
Total PAHs (ug/kg)	330	47J		1470J
Lead (mg/kg)	3			71.3J

- (1) A blank indicates that the sample was analyzed but not detected above background.  
TIC = Tentatively identified compounds.  
PAH = Polynuclear aromatic hydrocarbons  
J = Estimated.  
CRQL/CRDL = Contract Required Quantitation Limit/Detection Limit.

## **10.0 WASTE TYPES AND QUANTITIES - SITE 6B/6C - ENGINE RUNUP AREA/SOUTH END OF RUNWAY 32-14**

### **10.1 Site History/Description**

Environmental concerns are similar at the areas related to the fuel calibration area including the engine runup area (Site 6B), and the south end of runway 32-14 (Site 6C). Limited spills of jet fuel are known to have occurred at the engine runup area and engine test house at Site 6A; no record of spills exists for the areas at Sites 6B and 6C.

The runway engine runup area and the south end of Runway 32-14 are located 4,500 feet and 6,500 feet, respectively, east-southeast of the fuel calibration pad (see Figure 1-3). The engine runup area is a 500- by 100-foot concrete area adjacent to the taxiway on the southwest edge of Runway 32-14. It is located approximately 2,000 feet from the south end of Runway 32-14 (USGS, 1967).

The engine runup area is open to the taxiway and is surrounded by a metal blast fence on the three remaining sides. The area beyond the blast fence is open and grass covered. The area southwest of the runup area has been excavated to a depth of up to 6 feet (USGS, 1967; Navy, 1986).

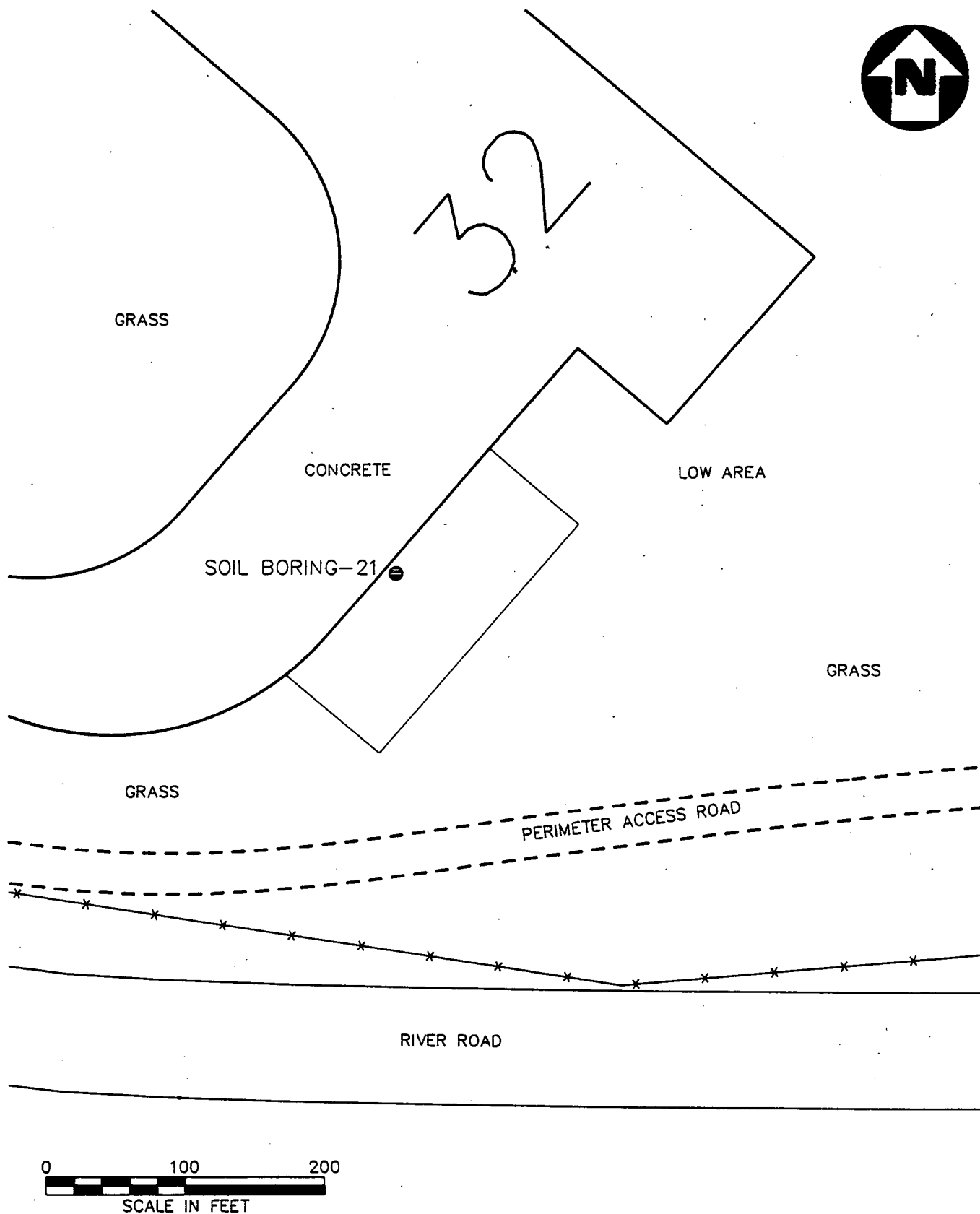
Site 6C is at the southwest corner of the runway, at the end of the concrete taxiway. Aircraft turn in this area to stage for take-off. The site is located approximately 200 feet north of River Road and 8,200 feet east of the south gate (USGS, 1967).

### **10.2 Field Activities**

Sampling activities at the engine runup area and south end of Runway 32-14 consisted of collecting 7 soil samples at 3 soil boring locations. See Figures 10-1 and 10-2 for the location of the sample points at the engine runup area and the south end of Runway 32-14, respectively. Each of the samples at the was analyzed for BTEX and PAHs.

Relevant field observations are as follows.

- No elevated HNU readings were observed in the two soil borings conducted in this area (Soil Borings 20 and 21).
- The approximate groundwater levels observed in the Soil Borings 20 and 21 were 15 feet and 20 feet, respectively.



SAMPLE LOCATION  
SITE 6C END OF RUNWAY 32-14  
SITE INVESTIGATION  
NWRP, CALVERTON, NEW YORK

FIGURE 10-2



**HALLIBURTON NUS**  
*Environmental Corporation*

TABLE 10-1

RESULTS OF ANALYSIS - SOILS (ug/Kg)  
 SITE 6B/6C  
 SITE INVESTIGATION  
 NWIRP CALVERTON, NEW YORK

PARAMETER	CRQL	SOIL 20	SOIL 20C	SOIL 20A	SOIL 20B	SOIL 21	SOIL 21A	SOIL 21B
Total PAHs	330	160J	130J		295J	347J	493J	

(1) A blank indicates that the sample was analyzed but not detected.

PAH = Polynuclear aromatic hydrocarbons.

J = Estimated.

C = Indicate a duplicate sample.

CRQL = Contract Required Quantitation Limit.

## 11.0 WASTE TYPES AND QUANTITIES - SITE 7 - FUEL DEPOT

### 11.1 Site History/Description

The fuel depot area was constructed in the early 1950's and has been active since that time. The depot consists of two areas of underground fuel and oil storage tanks. The UST areas are primarily soil covered, with scattered concrete pads surrounding fill and vent pipes. A concrete parking area for fuel tank trucks is immediately south of the UST areas. A pump house and truck filling bay are situated west of the UST areas.

The environmental concern at the fuel depot area is centered on soil and groundwater contamination by jet fuels such as JP-4 and JP-5. These fuels may have leaked from tanks or have been spilled during tank truck loading operations.

The fuel depot area is located approximately 3,000 feet north of the south gate, near the geographic center of the Calverton facility (see Figure 1-3). It is located at the eastern side of the road leading from the south gate and is approximately 2 acres in area, measuring 150 feet in width and 400 feet in length. The principal features of the fuel depot are a large concrete trucking-parking area covering the southern half of the depot, and two underground fuel storage tank areas: a 60- by 120-foot area covering the northeast area of the depot, and a 40- by 150-foot area covering the north-central area. The underground storage tank (UST) areas are primarily soil covered, with scattered concrete pads surrounding fill and vent pipes. A pump house is located at the western edge of the fuel depot, and a maintenance garage is located at the southeastern corner. The area is fully fenced (USGS, 1967; U.S. Department of the Navy, 1986).

Monitoring wells are located both within the fuel depot area and in the surrounding areas. A total of 34 monitoring wells are located in the area (Navy 1986; MPG, 1990-1991).

A garage and paved parking area for trucks and equipment used by the Grumman transportation department are located north of the fuel depot. Areas to the east and south are wooded. A paved roadway leading from the south gate is adjacent to the depot to the west; a storage building and the fuel system laboratory building are located west of the road (USGS, 1967; Navy, 1986).

The fuel depot is generally level, with a very slight slope to the east (USGS, 1967).

The fuel depot area is used for the storage and distribution of fuel products, such as JP-4 and JP-5 jet fuel at the facility. Fuels are stored in underground storage tanks. The material is then transferred to trucks for use in the flight preparation areas of the facility. These activities have resulted in groundwater



(FP)\* INDICATES THAT A FREE FLOATING PRODUCT WAS OBSERVED IN THE MONITORING WELL

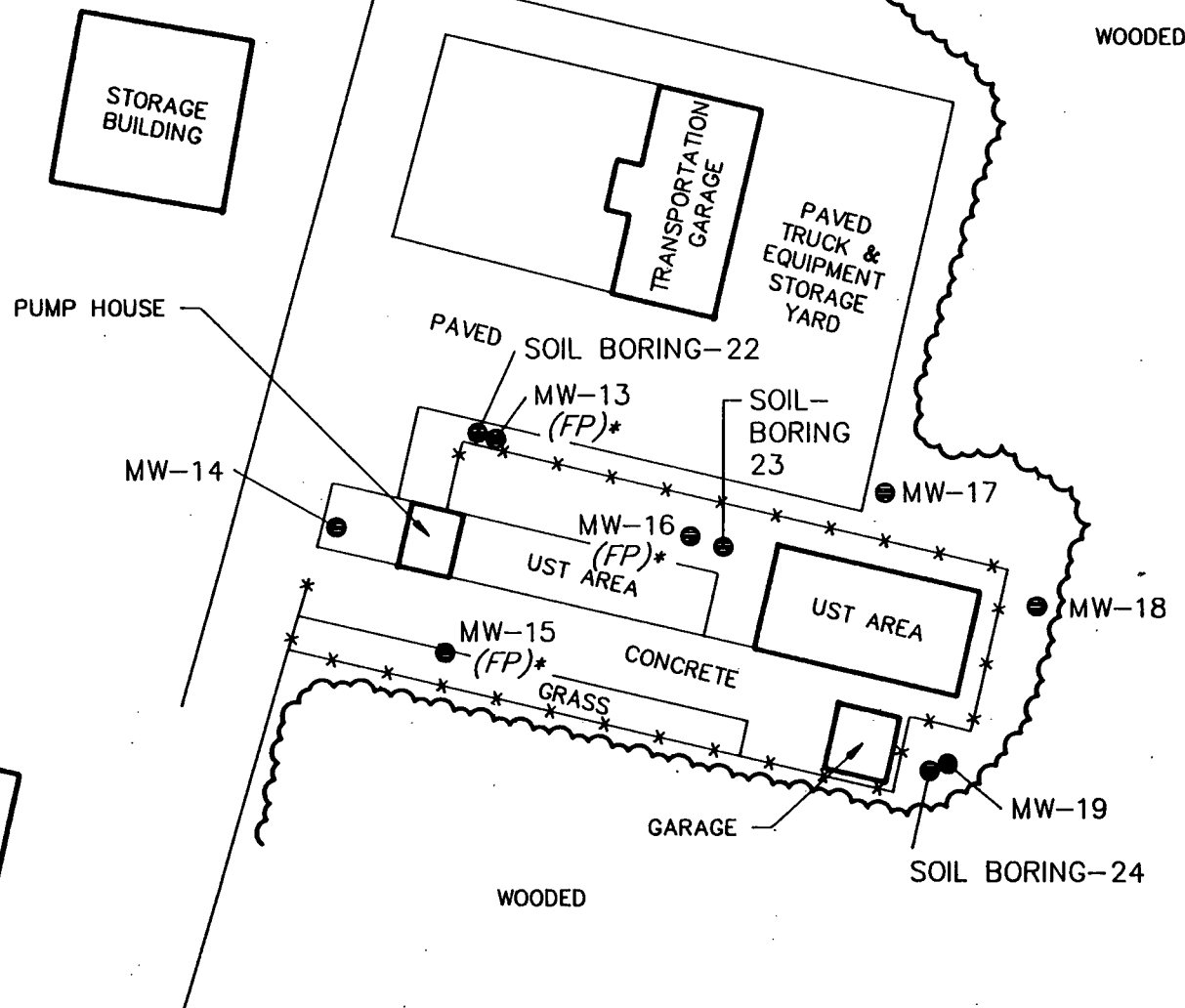


ACADE 3273 \MORRIS-ADWG

01/28/92

MAJ

11-3



0 100 200  
SCALE IN FEET

SAMPLE LOCATION  
SITE 7 - FUEL DEPOT AREA  
SITE INVESTIGATION  
NWIRP, CALVERTON, NEW YORK

FIGURE 11-1



**HALLIBURTON NUS**  
Environmental Corporation

TABLE 11-2

RESULTS OF ANALYSIS - SOILS (ug/Kg)  
 SITE 7 - FUEL DEPOT  
 SITE INVESTIGATION  
 NWIRP CALVERTON, NEW YORK

PARAMETER	CRQL	SOIL 22	SOIL 22A	SOIL 22B	SOIL 23	SOIL 23C	SOIL 23A	SOIL 23B	SOIL 24	SOIL 24A	SOIL 24B
1,2 - Dichloroethane	5					1J					5
Total PAHs	330	4750J			322	1,652J					
Total TIC PAHs						140					

- (1) A blank indicates that the sample was analyzed but not detected at a concentration above background.  
 (2) "J" indicates that value is estimated  
 "C" = Indicates that the sample is a field duplicate of the surface soil with the same sample number designation.  
 TIC = Tentatively identified compounds.  
 CRQL = Contract Required Quantitation Limit.

TABLE 11-3

RESULTS OF ANALYSIS - GROUNDWATER SUMMARY (ug/l)  
SITE 7 - FUEL DEPOT AREA  
SITE INVESTIGATION  
NWIRP CALVERTON, NEW YORK

PARAMETER	CRQL/ CRDL	CONCENTRATION RANGE
1,1,1-trichloroethane	5	ND to 1J
Benzene	5	ND to 390
Toluene	5	ND to 540
Ethylbenzene	5	ND to 120
Xylene	5	ND to 960
Total Phthalates	10	ND to 72
Total PAHs	10	ND to 86J
Lead	3	11.8 to 692

ND - None Detected

J - Estimated

CRQL/CRDL - Contract Required Quantitation Limit/Detection Limit.

As a result, minimal conclusions can be derived from these results.

**FREE PRODUCT**

PARAMETER	CONCENTRATION (ug/l)
Toluene	180
Ethylbenzene	440
Xylene	3,800
Lead	284

**11.4 Conclusions and Recommendations**

The results of the sampling and analysis indicated the presence of significant groundwater contamination at Site 7. The primary contaminants found were non-chlorinated volatile organics and lead.

Additional investigation of the soils and groundwater is recommended to characterize the nature and extent of contamination of the groundwater contamination plume as well as to identify the source of the groundwater contamination.

### 13.0 QA/QC SUMMARY

#### 13.1 Field QA/QC Samples

Field quality assurance/quality control samples consist of field duplicates, rinsate blanks, field blanks, trip blanks, and matrix spikes/matrix spike duplicates. NEESA Level C QA/QC criteria were specified.

NEESA requirements for Level C QA/QC samples are as follows.

QA/QC TYPE	NEESA REQUIREMENT
Field Duplicate	One duplicate in 10 samples per sample matrix.
Rinsate Blank	One sample of the final rinse during decontamination of sampling equipment per day. Initially, samples from every other day are analyzed. If analytes pertinent to the project are found in the rinsate, the remaining samples are analyzed.
Field Blank	One sample of each source water used for decontamination of sampling equipment for each sampling event.
Trip Blank	One sample of analyte-free water per day, for each shipment of samples for volatile organic analysis.
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One sample in 20 samples per sample matrix.

Over a 3-week period, which encompassed 11 sampling days, the following samples were collected: 67 soil samples, 5 sediment samples, 2 surface water samples, 19 groundwater samples, and 3 production well samples.

For the soils and sediment samples, 10 field duplicates and 7 MS/MSDs were collected. These samples correspond to a minimum of one field duplicate and one MS/MSD QA/QC sample per site. For the surface water, groundwater, and production well samples, 3 duplicates and 3 MS/MSDs were collected. In general, the MS/MSD analyses were not in compliance with the requirements. However, effected data was qualified and the quality of the data was not significantly compromised (See Appendix L).

Eleven trip blanks, one for each day of sampling, were submitted

<u>Sample</u>	<u>Parameter</u>	<u>Missed Holding Time (days)</u>
Soil-10	Semi-VOAs	3
Soil-10B	Semi-VOAs	3
Soil-20	VOAs	4
Soil-20A	VOAs	4
Soil-20B	VOAs	4
Soil-20C	VOAs	4
Soil-21	VOAs	1
Soil-21A	VOAs	1
Soil-21B	VOAs	1
Soil-23C	VOAs	1

#### **13.4 Data Validation**

The validated analytical data generated for this project is provided in Appendix J. Analysis of field, rinsate, and/or laboratory blank samples indicated the presence of several organic and inorganic contaminants. The data validation packages are being submitted under separate cover. Appendix L provides the data validation letters which summarizes the validation findings.

**TABLE 13-2**

**RINSATE CONTAMINATION (ug/l)  
SUMMARY  
SITE INVESTIGATION  
NWIRP CALVERTON, NEW YORK**

<b>PARAMETER</b>	<b>MAXIMUM CONCENTRATION</b>
Acetone	48
Benzoic Acid	10J
Phenol	14
Di-n-butyl phthalate	5J
Aluminum	27.8
Calcium	383
Iron	37.3
Lead	6.0
Magnesium	77
Manganese	2.7
Sodium	324
Zinc	68.3

J      Estimated.

## 12.0 WASTE TYPES AND QUANTITIES - PRODUCTION WELLS

### 12.1 Site History/Description

The three production wells are completed in the upper glacial aquifer. Well No. 2 was removed from service on January 10, 1991 and Well No. 3 was removed from service on May 15, 1991 because of volatile organic contamination (Navy 1986 and Smith, 1991). The volatile organic chemicals detected at 2 ug/l or greater and the maximum concentration detected in samples collected in March and April 1991 are summarized as follows.

Compound	Maximum Conc. Detected (ug/l)	Federal MCL (ug/l)	State MCL (ug/l)
1,1,1-trichloroethane	3	200	5
freon 113	14	No standard	5
vinyl chloride	2	2	2
(cis) 1,2-dichloroethene	2	70	5
1,1-dichloroethane	4	No standard	5

Historically, higher concentrations of 1,1,1-Trichloroethane (greater than 5 ug/l) have been detected in the production wells. Grumman is currently considering the addition of an air stripping tower to treat the production water prior to use.

### 12.2 Field Activities

Each of the three production wells at Calverton was sampled. See Figure 12-1 for the location of the three production wells. The samples were analyzed for volatile organics, semivolatile organics, metals, cyanide, PCBs, and pesticides.

Relevant field observations are as follows.

- The quantities of water pumped from the three production wells PW-1, PW-2, and PW-3 at the facility immediately prior to sampling are 34,000 gallons, 110,000 gallons, and 60,000 gallons, respectively.



### **12.3 Analytical Results**

The results of chemical analysis of the three production well samples are presented in Table 12-1. The results indicate the presence of low concentrations of chlorinated volatile organic compounds in two of the wells. No significant inorganic contamination was identified. No significant concentrations of TICs were identified.

### **12.4 Conclusions and Recommendations**

The results of the sampling and analysis indicated the presence of low but significant concentrations of chlorinated volatile organics in two of the production wells.

Further testing of the groundwater in the area of the production wells is recommended to identify the extent of the contamination plume. One location to be investigated is a former coal storage area for the nearby steam plant. Subsequent to the field investigation, the Navy was informed that this area may have been used for the disposal of spent solvents.

#### **14.0 POTENTIAL HAZARDOUS WASTE SITE - SITE INSPECTION REPORT**

This section of the Site Investigation report of the NWIRP Calverton, New York consists of the Site Inspection Report form.

## **SITE SUMMARY AND RECOMMENDATION**

The Naval Weapons Industrial Reserve Plant in Calverton, New York, is a United-States-Navy-owned facility operated by Grumman Aerospace Corporation. The facility was constructed in the early 1950s and has been used since that time for the design, assembly, and testing of naval aircraft and subassemblies. Manufacturing operations that have taken place at the site are related to metal finishing and electronic applications such as aircraft cleaning and aircraft painting. Aircraft are assembled and flown for the first time from the facility; the facility is also used for the refitting and retrofitting of aircraft. Additionally, the United States Navy and Grumman have conducted aircraft-crash fire-rescue training at the site.

An Initial Assessment Study completed for the United States Navy in December 1980 identified six potential or known sources of contamination at the site. These include two landfills (site no. 1, the Northeast Pond disposal area, and site no. 4, the picnic grounds disposal area), three aircraft fuel spill areas (site no. 6A, the fuel calibration area, site no. 6B/6C, the Runway 32-14 runup area site, and site no. 7, the fuel depot), and one site used for firefighting training (site no. 2, the fire training area) that was contaminated by spills and leaks of waste fuels and solvents.

The area surrounding the facility is rural, with scattered residences and farms. All residents within a four-mile radius of the site rely on groundwater for drinking water. Private home wells or municipal water systems provide drinking water to the residents.

The site is located in the drainage area of the Peconic River. The Peconic River is surrounded by extensive wetland areas. No direct surface water pathways exist to the Peconic River from any of the sites listed.

The geology in the area of the site has been strongly affected by past glaciation. Approximately 1,300 feet of unconsolidated sediments, including sands, gravels, silts, and clays, underlie the site. The formations are typically of high porosity and permeability, resulting in the rapid infiltration of storm runoff and in rapid groundwater movement. The groundwater table varies from between five and 20 feet beneath the site, with an average of 15 feet.

# **SITE ASSESSMENT REPORT: SITE INSPECTION** **PART I: SITE INFORMATION**

1. Site Name/Alias Calverton Naval Weapons Industrial Reserve Plant  
 Street River Road  
 City Calverton State New York Zip 11933
2. County Suffolk County Code 103 Cong. Dist.
3. EPA ID No. NY0170085559
4. Block No.  Lot No.
5. Latitude 40° 54' 26" North Longitude 72° 48' 07" West  
 U.S.G.S. Quadrangle Wading River, New York
6. Owner COMNAVAIRSYSCOM Telephone No.   
 Street Naval Systems Air Command Headquarters, Jefferson Plaza 2, Room 258  
 City Washington State DC Zip 20361
7. Operator Grumman Aerospace Telephone No.   
 Street   
 City Bethpage State New York Zip 11714
8. Type of Ownership  
☐ Private ☒ Federal ☐ State  
☐ County ☐ Municipal ☐ Unknown ☐ Other
9. Owner/Operator Notification on File  
☐ RCRA 3001 Date  ☐ CERCLA 103c Date   
☐ None ☒ Unknown
10. Permit Information  

Permit	Permit No.	Date Issued	Expiration Date	Comments
SPDES	0025453	unknown	unknown	Discharge to McKay Lake
11. Site Status  
☒ Active ☐ Inactive ☐ Unknown
12. Years of Operation 1950 to Present

**PART II: WASTE SOURCE INFORMATION**

For each of the waste units identified in Part I, complete the following items.

Waste Unit No. 1 - Site 1 - Northeast Pond Disposal Area

**Source Type**

<u>X</u>	Landfill	<u>        </u>	Contaminated Soil
<u>        </u>	Surface Impoundment	<u>        </u>	Pile
<u>        </u>	Drums	<u>        </u>	Land Treatment
<u>        </u>	Tanks/Containers	<u>        </u>	Other

**Description**

The Northeast Pond disposal area was used from the early 1950s until 1984 for the landfill disposal of aircraft sections, junked aircraft assembly tooling, office material and furniture, pallets, and paint cans. The material was used to fill portions of a land-locked glacial pond. The remaining area of the pond (2.3 acres) is classified as a wetland area. The area is unlined and covered by locally obtained soils.

**Hazardous Waste Quantity**

The disposal area is approximately 200 by 400 feet in area and a maximum 20 feet in depth. Grumman Aerospace estimated that approximately 7,500 cubic yards of material were placed in the disposal area.

**Hazardous Substances/Physical State**

Hazardous materials potentially present include petroleum, oils, and lubricants (POLs), asphalt paving material, halogenated and nonhalogenated solvents, and paint sludges. The materials may have been deposited as solids, liquids, and/or sludges. Soil borings conducted by HALLIBURTON NUS in July 1991 revealed the presence of a black cinder-like material, along with demolition debris and metal and fiberglass scrap. See Part III for contaminants identified during the HALLIBURTON NUS sampling in July 1991.

Ref. Nos. 1 and 2

**PART II: WASTE SOURCE INFORMATION**

For each of the waste units identified in Part I, complete the following items.

Waste Unit No. 3 - Site 4 - Picnic Grounds Disposal Area

**Source Type**

<u>X</u>	Landfill	<u>        </u>	Contaminated Soil
<u>        </u>	Surface Impoundment	<u>        </u>	Pile
<u>        </u>	Drums	<u>        </u>	Land Treatment
<u>        </u>	Tanks/Containers	<u>        </u>	Other

**Description**

The picnic grounds disposal area was used for the landfill disposal of scrap picnic tables, metal fabrications, fencing, demolition debris, foam, plastics, carpeting, and plywood. The area was active until the early 1980s and may have existed before the construction of the Calverton facility in the early 1950s. The waste materials were placed into an unlined pit; the area is covered by locally obtained soils.

**Hazardous Waste Quantity**

The disposal area is approximately 40 by 60 feet in size and may be up to eight feet in depth.

**Hazardous Substances/Physical State**

No evidence of hazardous waste disposal is known to exist. It is possible, however, because of the long time of operation, that hazardous materials were placed in the disposal area in the past. Soil borings conducted by HALLIBURTON NUS in July 1991 revealed the presence of wood, plywood, and plastic waste. See Part III for contaminants identified during the HALLIBURTON NUS sampling of the area in July 1991.

Ref. Nos. 1 and 2

**PART II: WASTE SOURCE INFORMATION**

For each of the waste units identified in Part I, complete the following items.

Waste Unit No. 5 - Site 6B/6C - Engine Runup Area/Southern End of Runway 32-14

**Source Type**

<input type="checkbox"/> Landfill	<input checked="" type="checkbox"/> Contaminated Soil
<input type="checkbox"/> Surface Impoundment	<input type="checkbox"/> Pile
<input type="checkbox"/> Drums	<input type="checkbox"/> Land Treatment
<input type="checkbox"/> Tanks/Containers	<input type="checkbox"/> Other

**Description**

These areas are adjacent to runway 32-14 on the eastern half of the facility and are subject to the exhaust of jet engines during engine runup before takeoff. A slight potential exists that leaked fuels washed from the paved runway onto the runup areas.

**Hazardous Waste Quantity**

The total combined area of potentially contaminated soils for the two runup areas is approximately five acres. No documented spills exist.

**Hazardous Substances/Physical State**

The hazardous materials potentially present in the two areas include liquid jet fuels such as JP-4 and JP-5. No documented spills exist. Soil borings conducted by HALLIBURTON NUS in July 1991 revealed no physical evidence of fuel contamination. See Part III for sampling results.

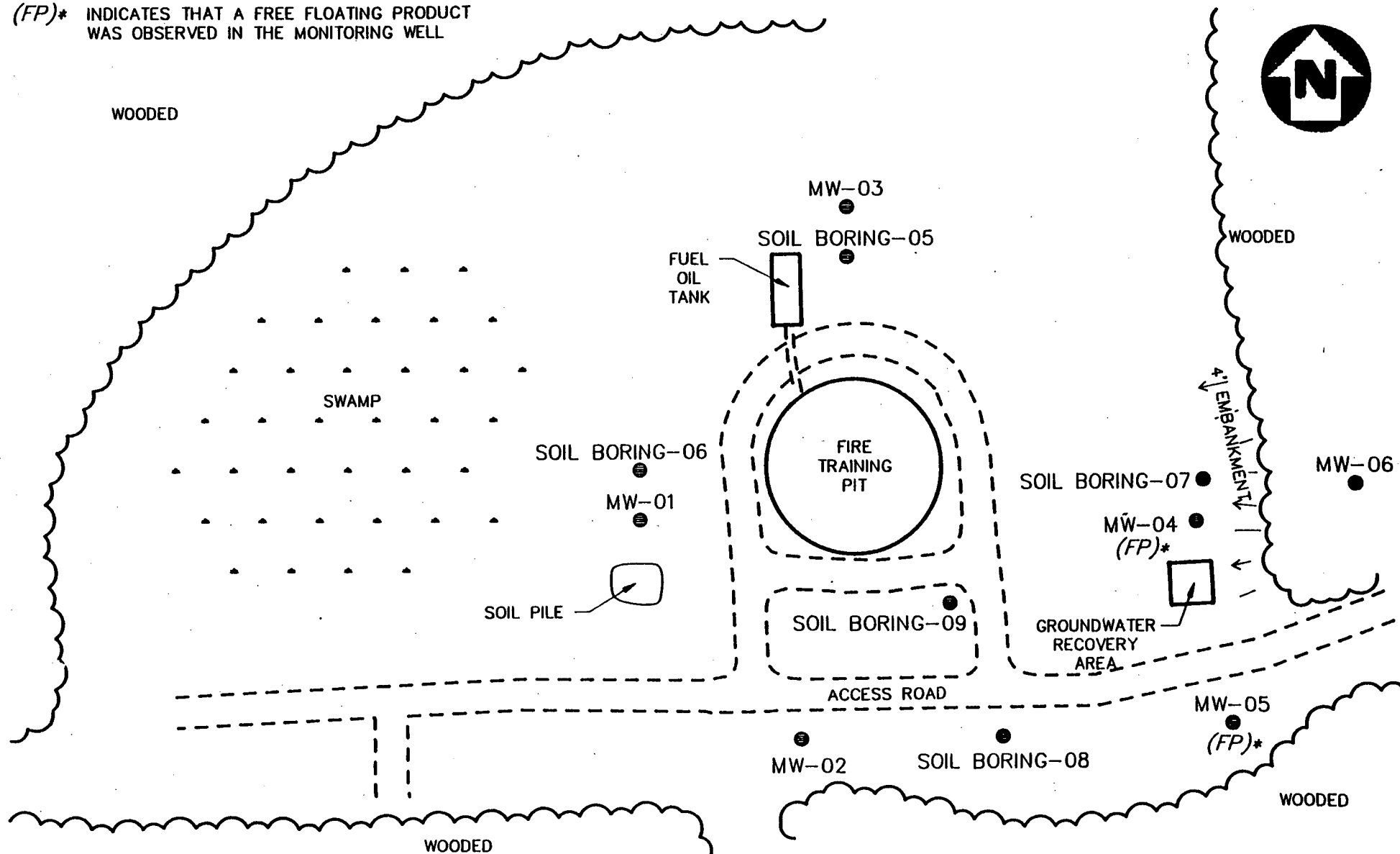
Ref. Nos. 1 and 2

**PART III: SAMPLING RESULTS**  
**EXISTING ANALYTICAL DATA**  
**SITE INSPECTION RESULTS**

See attached tables and figures.



(FP)\* INDICATES THAT A FREE FLOATING PRODUCT WAS OBSERVED IN THE MONITORING WELL



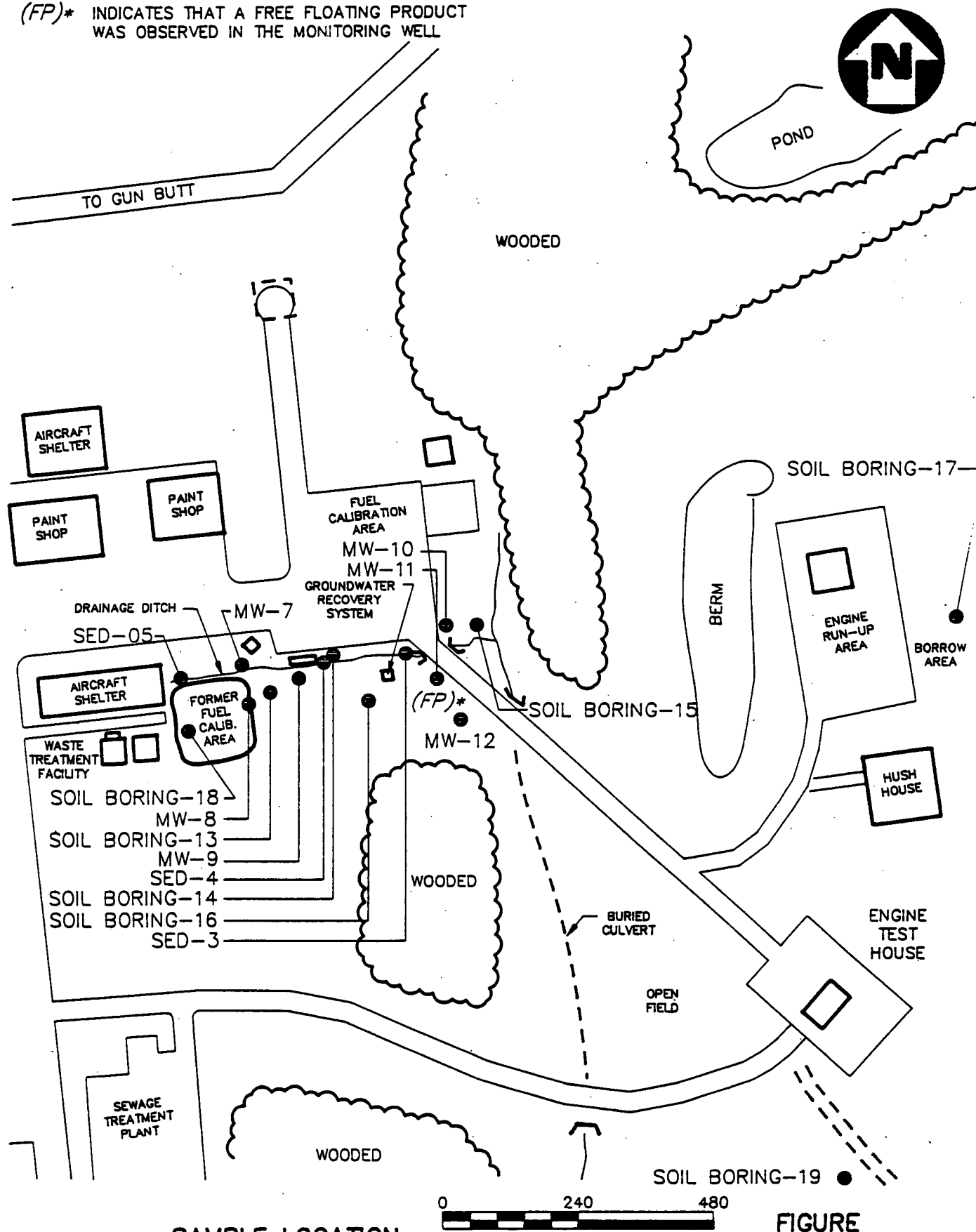
0 120 240  
SCALE IN FEET

SAMPLE LOCATION  
SITE 2 - FIRE TRAINING AREA  
SITE INVESTIGATION  
NWIRP, CALVERTON, NEW YORK

FIGURE

 **HALLIBURTON NUS**  
Environmental Corporation

(FP)\* INDICATES THAT A FREE FLOATING PRODUCT WAS OBSERVED IN THE MONITORING WELL

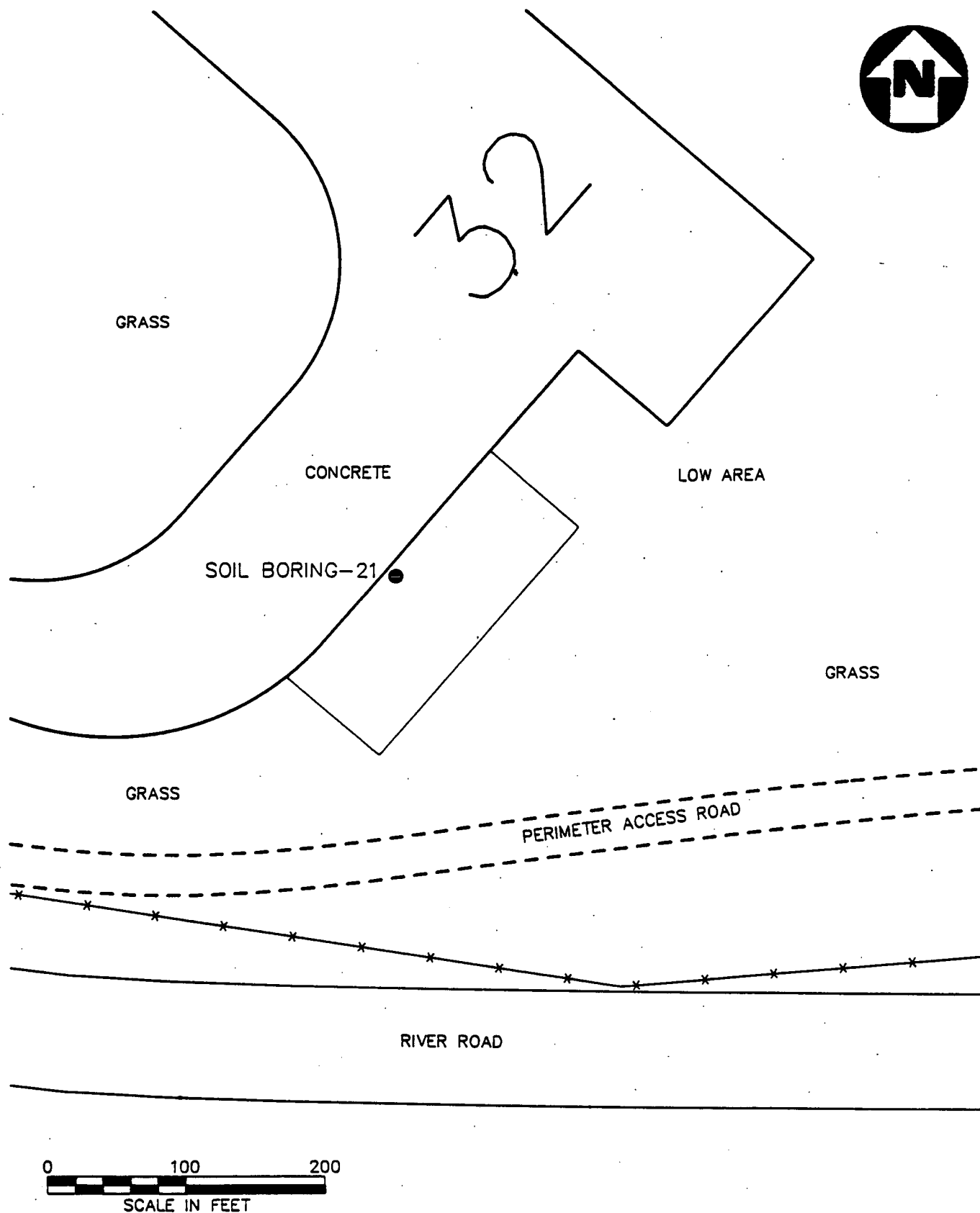


**SAMPLE LOCATION**  
**SITE 6A - FUEL CALIBRATION AREA**  
**SITE INVESTIGATION**  
**NWIRP, CALVERTON, NEW YORK**

**FIGURE**



**HALLIBURTON NUS**  
 Environmental Corporation

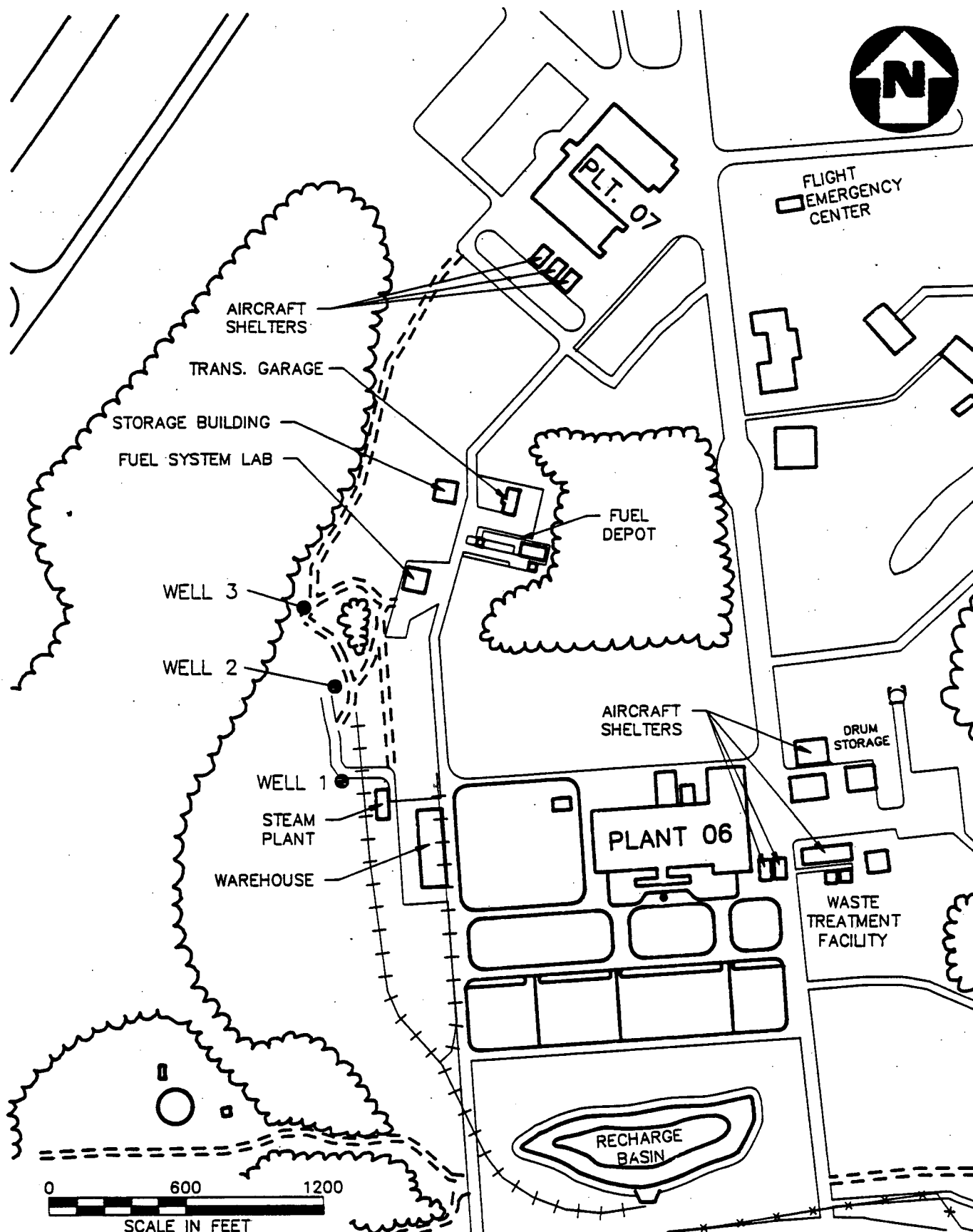


SAMPLE LOCATION  
SITE 6C END OF RUNWAY 32-14  
SITE INVESTIGATION  
NWRP, CALVERTON, NEW YORK

FIGURE



**HALLIBURTON NUS**  
*Environmental Corporation*

**FIGURE**

**SAMPLE LOCATION**  
**PRODUCTION WELLS**  
**SITE INVESTIGATION**  
**NWRP, CALVERTON, NEW YORK**



**HALLIBURTON NUS**  
*Environmental Corporation*

PARAMETERS	CONCENTRATION RANGE			
	CRQL/CRDL	DEPTH 0 TO 2 FEET	DEPTH 5 TO 7 FEET	SOIL/ GROUNDWATER INTERFACE
Vanadium (mg/kg)	10	ND	BB to 39.2J	BB to 85.2J
Zinc (mg/kg)	4	28.1J to 139J	BB to 385J	BB to 2,380J
Cyanide (mg/kg)	2	ND to 5.5	ND to 4.4	ND to 5.7

J - Estimated.

ND - None detected.

BB - Below background (See Table 5-1).

CRQL/CRDL-Contract Required Quantitation Limit/Detection Limit.

PAHs = Polynuclear aromatic hydrocarbons: benzo[a]pyrene, dibenzofuran, naphthalene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, benz[a]anthracene, benzo[g,h,i]perylene, indeno[1,2,3-c,d]pyrene, chrysene, pyrene, fluoranthene, anthracene, phenanthrene, fluorene, acenaphthene, acenaphthylene, and 2-methylnaphthalene.

PARAMETER	CRQL/ CRDL	SOIL 01	SOIL 01A	SOIL 01B	SOIL 02	SOIL 02A	SOIL 02B	SOIL 03	SOIL 03C	SOIL 03A	SOIL 03B	SOIL 04	SOIL 04C	SOIL 04A	SOIL 04B
Copper (mg/kg)	5	149J	153J	1,320J	26.3J	184J		104J	46.3J			11.4J	12.4J		
Iron (mg/kg)	20					15,100									
Lead (mg/kg)	0.6	42.5J	68.9J	314J	33.9J	62.4J		19.9J	30J						
Manganese (mg/kg)	3					482									
Mercury (mg/kg)	0.1	0.51	0.88			0.17									
Nickel (mg/kg)	8	14.7	35.9	233		118			9.9						
Silver (mg/kg)	2		4.9J	115J		2.2J		2.3J							
Vanadium (mg/kg)	10			85.2J		39.2J									
Zinc (mg/kg)	4	118J	206J	2,830J	81.5J	385J		139J	123J						
Cyanide (mg/kg)	2	5.5		5.7	4.1	4.4									

(1) A blank indicates that the sample was analyzed, but not detected above background concentrations.

TIC = Tentitively identified compounds.

PAH = Polynuclear aromatic hydrocarbons.

J = Estimated.

CRQL/CRDL - Contract Required Quantitation Limit/Detection Limit.

**RESULTS OF ANALYSIS - SEDIMENTS**  
**SITE 1 - NORTHEAST POND DISPOSAL AREA**  
**SITE INVESTIGATION**  
**NWIRP CALVERTON, NEW YORK**

PARAMETER	CRQL/ CRDL	SED 01	SED 02
1,2 - Dichloroethane (ug/kg)	5	2	2
Total TIC Phthalates (ug/kg)		240	
Chromium (mg/kg)	2	70.5	
Copper (mg/kg)	5	15.1	
Zinc (mg/kg)	4	58.9	

(1) A blank indicates that the sample was analyzed but not detected above background.

TIC = Tentatively identified compounds.

PAH = Polynuclear aromatic hydrocarbons

CRQL/CRDL = Contract Required Quantitation Limit/Detection Limit

[illegible]



**RESULTS OF ANALYSIS - GROUNDWATER SUMMARY**  
**SITE 2 - FIRE TRAINING AREA**  
**SITE INVESTIGATION**  
**NWIRP CALVERTON, NEW YORK**

PARAMETER	CRQL/CRQL (ug/l)	CONCENTRATION RANGE (ug/l)
Chloroethane	10	ND to 4,500
1,1-Dichloroethane	5	ND to 1,700
1,2-Dichloroethene	5	ND to 790
1,1,1-Trichloroethane	5	ND to 130J
Trichloroethene	5	ND to 10
Tetrachloroethene	5	ND to 5J
Toluene	5	ND to 320J
Ethylbenzene	5	ND to 12
Xylene	5	ND to 300J
1,2-Dichlorobenzene	10	ND to 74
4-Methylphenol	10	ND to 73
Total PAHs	10	ND to 154J
Total Phthalates	10	ND to 32J
Aroclor 1260	1	ND to 7.9
Aluminum	200	5,490 to 80,200
Arsenic	10	ND to 40.7J
Barium	200	ND to 215
Beryllium	5	ND to 5.4
Cadmium	5	3.5 to 22.8
Chromium	10	ND to 80.3
Iron	100	1640 to 125,000
Lead	5	ND to 73.8
Nickel	40	ND to 59.2
Vanadium	50	ND to 22.7
Zinc	20	ND to 1,290J
Cyanide	10	ND to 24.9

ND - None Detect

\* - All metal samples are unfiltered.

J - Estimated.

CRQL/CRDL - Contract Required Quantitation Limit/Detection Limit.

PARAMETER	CRQL/ CRDL	NW 01	NW 02	NW 03	NW 04	NW 04 FP	NW 05	NW 05 FP	NW 06
Arsenic	10	4.4	8.4	7.5			13.5		40.7J
Barium	200	129	137	103	91.9	8.4J	120	7.6J	215
Beryllium	5	2.1	2.3	3.1	1.5		2		5.4
Cobalt	50	23.5	37.4	32.7	21.9	11J	11.5	11J	63J
Cadmium	5	3.5	5.5	8.3			15.4		22.8
Chromium	10	13.5	25.5	31.1			74.1		80.3
Copper	25	21	60.9	61.2	34.8		337	11J	120
Lead	5	57.8	19	21.9		65.5	36	86.5	73.8
Iron	100	8,220	30,000	34,100	1,640	640J	75,100	4700J	125000
Magnesium	5000	2,760	4,860	1,890	710	58J	5,230	320J	7,840
Manganese	15	147	372	142J	97.5J	9.4J	632J	55J	2,680
Nickel	40	13.9	23.6	25	22	15J	16.2	14J	59.2
Vanadium	50	23.2	62.9	29.5	7.8		163		227
Zinc	20						1290J		179J
Cyanide	10		20	24.9J		NA		NA	
Aluminum	200	6,010	23,300	18,800	5,490	NA	36,400	NA	80,200

(1) A blank indicates that the sample was analyzed but not detected.  
TIC = Tentatively identified compounds.  
PAH = Polynuclear aromatic hydrocarbons.  
A = Duplicate result.  
FP = Free Product.  
J = Estimated.  
P = TICs are present.  
CRQL/CRDL = Contract Required Quantitation Limit/Detection Limit.

**RESULTS OF ANALYSIS - SOILS SUMMARY**  
**SITE 6A - FUEL CALIBRATION AREA**  
**SITE INVESTIGATION**  
**NWIRP CALVERTON, NEW YORK**

COMPOUNDS	CONCENTRATION RANGE			
	CRQL/CRDL	DEPTH 0 to 2 FEET	DEPTH 5 to 7 FEET	SOIL/ GROUNDWATER INTERFACE
Methylene Chloride (ug/kg)	5	ND to 1J	ND to 1J	ND
1,1,1- Trichloroethane (ug/kg)	5	ND	*	ND to 7,400J
Toluene (ug/kg)	5	ND to 7J	*	ND to 1,300J
Ethylbenzene (ug/kg)	5	ND to 130	*	ND to 2,700J
Xylene (ug/kg)	5	ND to 700	*	ND to 17,000J
Naphthalene (ug/kg)	330	ND to 1,400J	*	ND to 3,100
Lead (mg/kg)	3	BB to 21.2J	BB	BB

ND - None Detected

BB - Below Background (See Table 5-1)

J - Estimated.

\* Because of the shallow water table, unsaturated subsurface soil samples were not collected at Soil Borings 13, 14, 15, 16, and 17. Only 0- to 2-foot and soil/groundwater interface samples were collected at these locations.

CRQL/CRDL - Contract Required Quantitation Limit/Detection Limit.

PARAMETER	CRQL	SOIL 16C	SOIL 16A	SOIL 17	SOIL 17C	SOIL 17A	SOIL 18	SOIL 18C	SOIL 18A	SOIL 18B	SOIL 19	SOIL 19A	SOIL 19B
Methylene Chloride (ug/Kg)	5					1J	1J						
1,1,1- Trichloroethane (ug/Kg)	5												
Toluene (ug/Kg)	5												
Ethylbenzene (ug/Kg)	5												
Xylene (ug/Kg)	5												
Total PAHs (ug/Kg)	330												
Total TIC PAHs (ug/Kg)													
Total TIC Phthalates (ug/Kg)													

(1) A blank indicates that the sample was analyzed but not detected above background.

TIC = Tentatively identified compounds.

PAH = Polynuclear aromatic hydrocarbons.

C = Duplicate result.

J = Estimated.

CRQL/CRDL = Contract Required Quantitation Limit/Detection Limit.

**RESULTS OF ANALYSIS - GROUNDWATER (ug/l)**  
**SITE 6A - FUEL CALIBRATION AREA**  
**SITE INVESTIGATION**  
**NWIRP CALVERTON, NEW YORK**

PARAMETER	CRQL/ CRDL	MW 07	MW 08	MW 09	MW 10	MW 11	MW 11 FP	MW 12
Chloroethane	10			2,600				
1,1-Dichloroethane	5	19		300	6	3J		
1,1,1-Trichloroethane	5	9		23	4J			
1,1-Dichloroethene	5			27				
Trichloroethene	5			3J				
Benzene	5			4J				
Toluene	5			140				
Ethylbenzene	5			68		32		
Xylenes	5			450		290J		
1,2-Dichlorobenzene	10			3J				
Total PAHs	10			145		10,300J	5J	
Total TIC PAHs				44				
Total Phthalates	10	3J	2J		2J	380		5
TICs		P	P	P	P			
Lead	3	1,740	148	55	43.4	33.5	218	142

(1) A blank indicates that the sample was analyzed but not detected.

TIC = Tentatively identified compounds.

PAH = Polynuclear aromatic hydrocarbons.

FP = Free Product.

P = TIC are present.

CRQL/CRDL - Contract Required Quantitation Limit/Detection Limit.

RESULTS OF ANALYSIS - SOILS (ug/Kg)  
 SITE 6B/6C  
 SITE INVESTIGATION  
 NWIRP CALVERTON, NEW YORK

PARAMETER	CRQL	SOIL 20	SOIL 20C	SOIL 20A	SOIL 20B	SOIL 21	SOIL 21A	SOIL 21B
Total PAHs	330	160J	130J		295J	347J	493J	

(1) A blank indicates that the sample was analyzed but not detected.

PAH = Polynuclear aromatic hydrocarbons.

J = Estimated.

C = Indicate a duplicate sample.

CRQL = Contract Required Quantitation Limit.

**RESULTS OF ANALYSIS - SOILS (ug/Kg)**  
**SITE 7 - FUEL DEPOT**  
**SITE INVESTIGATION**  
**NWIRP CALVERTON, NEW YORK**

PARAMETER	CRQL	SOIL 22	SOIL 22A	SOIL 22B	SOIL 23	SOIL 23C	SOIL 23A	SOIL 23B	SOIL 24	SOIL 24A	SOIL 24B
1,2 - Dichloroethane	5					1J					5
Total PAHs	330	4750J			322	1,652J					
Total TIC PAHs						140					

- (1) A blank indicates that the sample was analyzed but not detected at a concentration above background.  
(2) "J" indicates that value is estimated  
"C" = Indicates that the sample is a field duplicate of the surface soil with the same sample number designation.  
TIC = Tentatively identified compounds.  
CRQL = Contract Required Quantitation Limit.

**RESULTS OF ANALYSIS - GROUNDWATER (ug/l)**  
**SITE 7 - FUEL DEPOT AREA**  
**SITE INVESTIGATION**  
**NWIRP CALVERTON, NEW YORK**

PARAMETER	CRQL	MW 13	MW 13A	MW 14	MW 15	MW 16	MW 16 FP	MW 17	MW 18	MW 19
1,1,1- Trichloroethane	5									1J
Benzene	5					14J			390	
Toluene	5		33		2J	130	180		540	
Ethylbenzene	5		120			84	440	5	100	
Xylenes	5	720	960		27	450	3,800	10	270	
Total PAHs	10					86J				
Total TIC PAHs						44			62	
Total Phthalates	10			72						5
TICs			P	P	P	P	P	P	P	P
Lead	3	19.7	20.6	23.6	692	11.8	284	31	22.2	42

- (1) A blank indicates that the sample was analyzed but not detected.
- (2) "P" indicates that TICs are present in the sample.
- (3) "J" indicates that value is estimated
- (4) "A" indicates a duplicate sample.



## PART IV: HAZARD ASSESSMENT

### GROUNDWATER ROUTE

1. Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence.

An observed release to groundwater has occurred at site nos. 2, 6A, and 7. Contaminants include POLs, halogenated and nonhalogenated lead solvents, and lead. A potential to release contaminants such as heavy metals exists at site no. 1. Site nos. 4, 6B, and 6C have a limited or no potential to release to groundwater. The release is supported by HALLIBURTON NUS soil and groundwater sampling conducted in July 1991. Additionally, similar contaminants were found in surface soil and or subsurface soil sample locations in the areas of observed release.

Ref. No. 1

2. Describe the aquifer of concern; include information such as depth, thickness, geologic composition, areas of karst terrain, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.

The site is underlain by approximately 1,300 feet of unconsolidated sediments, including (in descending order) the Upper Glacial Formation, the Magothy Formation, the Raritan Clay Member of the Raritan Formation, and the Lloyd Sand Member of the Raritan Formation. The unconsolidated material is underlain by crystalline bedrock consisting of schist, gneiss, and granite.

The topography of the Upper Glacial Formation was created or modified by Pleistocene glaciation. The formation is present to approximately 250 feet thick and consists of well to poorly sorted soils and gravels, along with discontinuous layers of silts and clays. The hydraulic conductivity ( $9.5 \times 10^{-2}$  cm/s) is high, as is the porosity. No continuous confining layers exist. The depth to the water table ranges from approximately five feet (site 6A) to 20 feet (site 1).

The Magothy Formation is approximately 520 feet thick, occurring from approximately 250 to 770 feet below the site. The formation consists of stratified fine to coarse sands and gravels. The hydraulic conductivity is approximately  $2.5 \times 10^{-2}$  cm/s.

The Raritan Clay is approximately 170 feet thick, occurring from 770 to 940 feet below the site. The formation consists of clay and silty clay and forms a confining layer between the Magothy and underlying Lloyd Sand aquifers. The permeability of the formation is approximately  $1.1 \times 10^{-8}$  cm/s.

The Lloyd Sand Formation is approximately 400 feet thick beneath the site and occurs from a depth of approximately 940 to 1,340 feet beneath the site. The Lloyd Sand consists of fine to coarse sands and gravels. Hydraulic conductivities in the formation range from  $7.1 \times 10^{-3}$  to  $2.5 \times 10^{-2}$  cm/s.

The Upper Glacial and Magothy Formations are considered to be hydraulically interconnected. The general direction of groundwater flow beneath the site is to the southeast. The elevation of the site varies from 30 to 84 feet above sea level.

Ref. Nos. 1 and 2

9. Identify the population served by wells located within four miles of the site that draw from the aquifer of concern.

<u>Distance</u>	<u>Population</u>
0 to 1/4 mile	2,818
> 1/4 to 1/2 mile	137
> 1/2 to 1 mile	359
> 1 to 2 miles	3,853
> 2 to 3 miles	982
> 3 to 4 miles	4,426

Ref. Nos. 1, 2, 3, and 7

10. Identify uses of groundwater within four miles of the site (i.e., private drinking source, municipal source, commercial, irrigation, unusable).

Groundwater is used as a private drinking water source and a municipal source and for irrigation.

Ref. Nos. 1, 2, and 7

#### **SURFACE WATER ROUTE**

11. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence.

No release of contaminants to surface water is known to have occurred.

Ref. Nos. 1 and 2

12. Identify the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.

Surface water runoff from the facility is received either by land-locked glacial ponds or the Peconic River and its tributaries. The landfill at site no. 1, the Northeast Pond disposal area, was used to fill a portion of a land-locked glacial pond. A portion of the 2.3-acre pond is classified by the Department of the Interior as a palustrine forested/scrub/shrub wetland.

Surface water runoff from site no. 2, the fire training area, flows to the southeast and is expected to infiltrate into the soil. The nearest surface water body to the fire training area is Swan Pond, located 2,000 feet to the southeast. Swan Pond outfalls to a tributary of the Peconic River. No drainage pathway to Swan Pond exists.

Surface water runoff from site no. 4, the picnic grounds disposal area, is expected to flow southward and infiltrate into the soil. The nearest surface water is the land-locked 1.75-acre North Pond, located 1,500 feet south of the North Pond. No drainage pathway to North Pond exists.

16. Identify drinking water intakes in surface waters within 15 miles downstream of the site. For each intake, identify the distance from the point of surface water entry, population served, and stream flow at the intake location.

<u>Intake</u>	<u>Distance</u>	<u>Population Served</u>	<u>Flow (cfs)</u>
None			

Ref. Nos. 1 and 2

17. Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each fishery, specify the following information:

<u>Fishery</u>	<u>Water Body Type</u>	<u>Flow (cfs)</u>
McKay Lake	lake	N/A
Swan Pond	lake	N/A
Unnamed tributary of Peconic River from Swan Pond	small to moderate stream	10 to 100 cfs
Peconic River	moderate to large stream	100 to 1,000 cfs
Peconic River	coastal tidal waters	N/A
Peconic Bay	coastal tidal waters	N/A

Ref. No. 4

18. Identify sensitive environments that exist within 15 miles of the point of surface water entry. For each sensitive environment, specify the following:

<u>Environment</u>	<u>Water Body Type</u>	<u>Flow (cfs)</u>
State-designated habitat of endangered or threatened species	lake - Swan Pond	N/A
State-designated habitat of endangered or threatened species	small to moderate stream - unnamed tributary - Swan Pond to Peconic River	10 to 100 cfs
State-designated habitat of endangered or threatened species	moderate to large stream - Peconic River	100 to 1,000 cfs

Ref. Nos. 1, 2, 4, 8, and 9

24. Determine populations that reside within four miles of the site.

<u>Distance</u>	<u>Population</u>
0 to 1/4 mile	18
> 1/4 to 1/2 mile	137
> 1/2 to 1 mile	359
> 1 to 2 miles	1,827
> 2 to 3 miles	2,654
> 3 to 4 miles	4,058

Ref. Nos. 1, 2, and 7

25. Identify sensitive environments and wetlands acreage within 1/2 mile of the site.

The wetland acreage within 1/2 mile of the site is 179.4 acres; 7.9 acres of wetlands are located on site. The remainder of the wetland areas surround Swan Pond and the Peconic River and its tributaries.

Sensitive Environment

Distance

Northeast Pond wetland: State-designated habitat of endangered or threatened species.

on site

Unnamed ponds south of site no. 6A: State-designated habitat of endangered or threatened species.

on site

Wetlands surrounding Swan Pond and the Peconic River and its tributaries: State-designated habitat of endangered or threatened species.

500 feet south of site  
no. 6C

The New York State Department of Environmental Conservation (NYSDEC) has identified the ponds south of site no. 6A, possibly along with the Northeast Pond, as a habitat for the NYSDEC-listed endangered species the tiger salamander (Ambystoma tigrinum). Other endangered or threatened species potentially present include the northern cricket frog (Acris crepitans) and the least tern (Sterna Antillarum).

NYSDEC has stated that the wetlands along the Peconic River south of the site include habitats for many endangered or threatened animals and plants, including those listed above.

Ref. Nos. 1, 2, 4, 8, and 9

26. If a release to air is observed or suspected, determine the number of people that reside or are suspected to reside within the area of air contamination from the release.

No release to air has been observed or is expected.

Ref. Nos. 1 and 2

## REFERENCES

Anderson, Lawrence, 1991. Meeting between Lawrence Anderson, Chief Engineer, Shorewood Water Company, and Randy Patarcity and Kevin Kilmartin, HALLIBURTON NUS Environmental Corporation on August 2.

Brookhaven National Laboratory, 1991. Water Usage Report, Brookhaven, New York, 1991.

Buffington, Burrell, 1991. Correspondence from B. Buffington, New York State Department of Environmental Conservation Significant Habitat Unit, New York Natural Heritage Program, to Randy Patarcity, HALLIBURTON NUS Correspondence dated October 10.

Clayton, G.D., and F.E. Clayton, 1981. Patty's Industrial Hygiene and Toxicology. Third Edition Revised, Volume 2C. John Wiley & Sons, New York.

Clayton, G.D., and F.E. Clayton, 1982. Patty's Industrial Hygiene and Toxicology. Third Edition Revised, Volume 2B. John Wiley & Sons, New York.

Corin, Leonard P., 1991. Correspondence from L. Corin, Field Supervisor, United States Department of the Interior, Fish and Wildlife Service, to David D. Brayack, P.E., HALLIBURTON NUS Correspondence, dated September 20.

DOE (United States Department of Energy) 1990. Brookhaven National Laboratory, Safety and Environmental Protection Division. Brookhaven National Laboratory Site Environmental Report for Calendar Year 1989.

Doull, J., C.D. Klaassen, and M.O. Amdur, 1986. Casarett and Doull's Toxicology: The Basic Science of Poisons. Third Edition, MacMillan Publishing Company, New York.

Dragun, J., 1988. The Soil Chemistry of Hazardous Materials. HMCRI/Silver Spring, Maryland

EPA, 1976. Quality Criteria for Water. Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C.

EPA, 1979. National Secondary Drinking Water Regulations. Office of Drinking Water, Washington, D.C.

EPA, 1980a. Ambient Water Quality Criteria for Cyanides. EPA 440/5-80-037, Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C.

Guthrie, Charles A., 1983. Correspondence from C Gunthrie, Senior Aquatic Biologist, New York State Department of Environmental Conservation, to Charles Smith, Grumman Aerospace Corporation, dated December 22.

Guthrie, Charles A., 1984. Corrospondance from C Guthrie, Senior Aquatic Biologist, New York State Department of Environmental Conservation, to Charles Smith, Grumman Aerospace Corporation, dated December 17.

Isbister, J., 1966. "Geology and Hydrology of Northeastern Nassau County, Long Island, New York, Water Supply Paper 1825, U.S. Geological Survey.

Jensen, H. M., and J. Soren, 1974. "Hydrology of Suffolk County, Long Island, New York." HA 0501, Hydrologic Investigations Atlas.

McClymonds, N., and O. Franke, 1972. "Water Transmitting Properties of Aquifers on Long Island, New York." U.S. Geological Survey Professional Paper 627-E.

National Academy of Sciences, 1977. Drinking Water and Health. Volume 1. Safe Drinking Water Committee, Washington, D.C.

National Oceanic and Atmospheric Administration, 1982. No. 81, Climatology of the United States, "Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1951-1980." New York, September.

New York State Sanitary Code, 1991. Public Water Supplies. Chapter 1, Subpart 5-1, July 3.

Ohlman, John, 1982-1985. Grumman Aerospace Corporation File Memorandums February 25, 1982-March 5, 1985.

Pendzick, Gary, 1991. Telecon from G. Pendrick, Riverhead Water District, to Randy Patarcity, HALLIBURTON NUS Environmental Corp., dated October 24.

Pendzick, Gary, 1991a. Meeting between Gary Pendzick, Superintendent, Riverhead Water District and Randy Patarcity and Kevin Kilmartin, HALLIBURTON NUS on August 1.

Parish, Walter, R., 1987. Correspondence from W. Parish, Assistant Sanitary Engineer, New York State Department of Environmental Conservation, to John Ohlman, Grumman Aerospace Corporation, dated October 8.

Sax, N.I., and R. J. Lewis, Sr., 1989. Dangerous Properties of Industrial Materials. Seventh Edition, Van Nostrand Reinhold Company, New York.

Study of NWIRP Bethpage, New York and NWIRP Calverton, New York.  
Naval Energy and Environmental Support Activity, December.

United States Geologic Survey (USGS), 1967. Wading River, New York quadrangle, 7.5 minute series. Topographic Map; combined with Riverhead, New York quadrangle, 7.5 minute series, Topographic Map, 1956 and Moriches, New York quadrangle, 7.5 minute series. Topographic Map, 1967 and Eastport, New York, 7.5 minute series, Topographic Map, 1956 and Bellport, New York quadrangle, 7.5 minute series, Topographic Map, 1967 and Middle Island, New York, 7.5 minute series, Topographic Map, 1967.

Versar, Incorporated, 1979. Water-Related Environmental Fate of 129 Priority Pollutants. EPA 440/4-79-029, Prepared for USEPA, Monitoring and Data Support.

Verschueren, K., 1983. Handbook of Environmental Data on Organic Chemicals. Second Edition. Van Nostrand Reinhold Company, New York.

Windholz, M., et al., 1983. The Merck Index. Tenth Edition. The Merck Company, Inc., Rahway, New Jersey.





**CALVERTON HBS**

NWIRP Calverton supplies 2,800 workers with drinking water from three on-site and two off-site wells. Production well No. 1 is the only active on-site well. Wells No. 2 and 3 are not used because of volatile organic compound contamination. The two off-site wells are Grumman production wells which serve Plant 8 and Plant 78. These wells are located south of the facility near the main gate.

The Riverhead Water District (RWD) serves 22,500 residents with drinking water obtained from nine wells. Two of RWD's wells are located within a four-mile radius of the site. The 1990 apportioned service population is 2,096.

The Shorewood Water Company (SWC) serves 5,243 residents with drinking water obtained from seven wells. Two of SWC's wells are located within a four-mile radius of the site. The 1990 apportioned service population is 2,763.

The Brookhaven National Laboratories (BNL) serves 609 residents and 3,000 workers from seven wells. Four of these wells are located within a four-mile radius of the site. The 1990 apportioned service population is 202 residents and 996 workers.

A total of 3,718 residents are supplied with drinking water obtained from private home wells located within four-mile radius of the site.

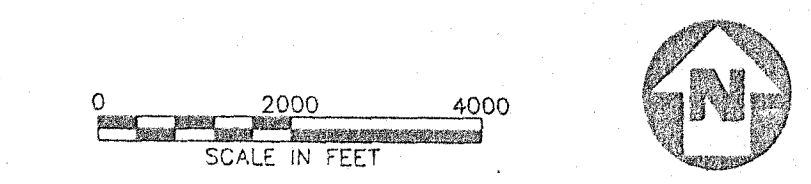


PLATE 1  
LOCATION OF GROUNDWATER WELLS  
WITHIN A 4-MILE RADIUS  
SITE INVESTIGATION  
NWIRP, CALVERTON, NEW YORK



SOURCE DOCUMENTS: USGS TOPOGRAPHIC MAP 7.5 MINUTE SERIES  
QUADRANGLES - WADING RIVER NEW YORK, 1967; - RIVERHEAD  
NEW YORK, 1967; - WOODBURY NEW YORK, 1967; - EASTPORT NEW YORK,  
1956; - BELLPORT NEW YORK, 1967; AND - MIDDLE ISLAND NEW YORK, 1967.